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[OFFICIAL NOTICE.]

Fifth Annual Meeting of the Central New York Gas Engineers Association.

The fifth annual meeting of the Central New York Gas Engineers' Association will be held at the St. James Hotel, Bradford, Pa., on Wednesday, May 23, at three o'clock P. M. It is earnestly requested that every member will be in attendance, and use every endeavor to make the meeting a profitable one. Please notify the President at Hornellsville, N. Y., by May 10, whether or not you will be in attendance.

C. A. WHITE, Secretary. J. MCDOUGALL, President.

THE attention of gas works builders is directed to the advertisement of Mr. John H. Knowles, Superintendent of the City Gas Works, Richmond, Va., which will be found on page 205.

[OFFICIAL NOTICE.]

Notice of the Sixth Annual Meeting of the Western Gas Association.

SECRETARY'S OFFICE, WESTERN GAS ASSOCIATION, QUINCY, ILL.

To the Superintendents of the Gas Companies of the West.

The Sixth Annual Meeting of the Association will be held at Cincinnati, Ohio, on the 9th, 10th and 11th days of May. Reduced rates for the accommodation of members in attendance have been secured at the Burnet House, which will be used as the headquarters of the Association.

I am at present unable to announce a complete list of the papers that will be read, owing to the failure of a few of the writers to inform me of the subjects they have chosen. So far as heard from, however, the titles of the articles that will be presented, with the names of their authors, are as follows:

The Construction and Management of Gas Works, by G. A. Hyde.
Some Observations on the Specific Gravity of Gas, by James Somerville.
Bench Furnaces—Regenerative and Recuperative, by John Gimper.
The Advantages of State Organizations, by George G. Ramsdell.
The Lowe Process, by George B. Burns.
Condensation, by James R. Smedberg.
The Gas Stove, by E. J. King.

Members of our Association and those desirous of joining us are respectfully requested to be present. A. W. LITTLETON, Secretary.

THE SUMMER'S WORK.

The time is now fully at hand when the managers of our gas works must map out the summer's work, particularly as regards extension and repairs; it will be well, therefore, to consider briefly a few points in connection with this all important subject.

The remark has been made in these columns, over and over again, that a gas works to be made to pay must be kept, not only in thorough repair, and its manufacturing capabilities more than equal to the demands likely to be made upon it, but also well up to the advancing spirit of the age; it, therefore, only remains to emphasize the advice by repeating it now.

There is certainly nothing so discouraging to a manager as to have committed to his care a works which is not equal to the demand made upon it; or, if its producing power is all sufficient, is lacking in what may be called the modern improvements of gas manufacture. As an instance of an overstrained plant we may refer to Richmond, Virginia.

According to a letter from the Mayor of that city which is published on another page of this number of the JOURNAL, it appears that the maximum daily outsend of the city's gas works this last year was 550,000, whereas the nominal power of the plant is only 300,000. And yet the municipal government cannot agree on any plan for the extension of the works.* This, too, in the face of the positive knowledge that the factory cannot be pressed harder than it has been this last season; and, therefore, if the matter is longer delayed, the demand for gas next winter cannot be met. We fear this is not an isolated case of foolhardiness; but greater publicity is given to it because the works in question are owned by the city, and the inner workings of the department are open to the view of the people. To all such parties who are pressing their plant beyond its capacity, we can only say they are pursuing a penny-wise but a hundred-pound-foolish policy. There are many reasons

*Since this was written an appropriation has been granted.

which could be advanced in support of this stricture; but the main one is that where the state of affairs we have alluded to exists, all other considerations must be held subordinate to the all-important one of having sufficient gas in the holders for the evening. Never mind at what cost, the gas must be made; never mind how expensive the coal which must be used in its production; nor can they stop to pay heed to the amount of coke that is being used in its manufacture, or the lime employed in its purification. There is no time to pay attention to such matters; all is bustle and confusion in the endeavor to ensure a sufficiency of gas for the night. In the matter of purification (which, in the present instance, we can take to include condensation) we doubt not that in a works pressed 25 per cent. beyond its nominal capacity, the increased cost of manufacture will be 5 cents a thousand feet for this one item alone, because if the gas is hurried through the condensers, so little tar will be removed, and the temperature of the gas will remain so high, that the scrubbers will do little work, and a part of the lime in the purifiers will be devoted to the extraction of the tar and ammonia. Moreover, time is a most potent factor in the work of purification. If the speed of the gas is rapid, when passing through the purifiers, there will not be sufficient time for the chemical action between the lime and the impurities of the gas to take place, consequently the test will show "foul" before one-half of the lime is utilized. We do not think it is necessary to amplify in this direction, as any one of ordinary common sense knows it is poor economy to drive any machine beyond the capacity for which it was built.

The next point to be considered is—If the capacity of the plant is to be increased, shall the general principles of the extensions be identical with those already prevailing in the works, or shall they deviate in certain particulars, or shall the changes be absolute and radical? There is no doubt that the middle course is the happy one. The mechanical details must needs be greatly changed; but the underlying principles will require but little variation.

First, as to the latter: We know now that, for the proper distillation of the coal, it is necessary to have a sharp heat at the commencement of a charge, for by so doing we will gain both in the quality and the quantity of gas. It is equally well known that the tar should be separated from the gas before the latter is cooled, and that the position for scrubbers is after, not before, the exhauster. Likewise, time has shown the importance of having purifiers of large area so as to allow ample opportunity for the chemical reactions which take place at this point.

As to the mechanical details, the six feet arch must give way to the setting 1½ feet wider, and the 12 × 20 inch retorts must be replaced by those measuring 15 × 30 inches. If a generator furnace is not adopted at once, the arch must be built so that it can easily be remodeled in the near future. Moreover, the retort house and all contained therein, must be built on the plan of conserving the heat produced by the coke. The tar eliminator which will give the most friction, and the temperature of which can be most readily controlled, will be the one to be adopted. When tower scrubbers are erected, the tendency now is to increase their height but diminish the diameter.

While we have thus touched upon a few points of more or less general application, we would note that there are local considerations which must be taken account of in each individual case. As an instance in point. There are several scrubbing machines which will work well if a liquor of only 8 or 10 ounce strength is desired; but if, in order to reduce carriage rates, it is required to work this residual up to a very strong point, then, choice must be made from among two or three apparatuses. Again, the matter of improved furnaces is such a promising one, that if several benches of retorts are to be erected, it will be advisable to put up at least one setting to be heated by a generator, if only by way of experiment; but in a very small works it might hardly be deemed prudent to introduce such an innovation until it had been thoroughly tried and perfected, either in larger works or else at the expense of one who had a pecuniary interest in the furnace.

If a gas works be reconstructed or extended on the principle we have outlined, we are confident that better gas can be made at a smaller cost than by making a radical change in the system of manufacture.

"THE GAS MANAGER'S HANDBOOK."

BY THOMAS NEWBIGGING, M.I.C.E.

We have received from the publisher, Mr. Walter King, of London, Eng., a copy of the third edition (illustrated) of Mr. Thomas Newbigging's "Gas Manager's Handbook." The book has been extended and improved, and its value as a ready work of reference is therefore greatly enhanced. The publisher is deservedly complimented upon the style and appearance of the third edition, it being of convenient size and shape, and will readily slip into a coat pocket. Every gas man in this country should have a copy of "Newbigging."

Bids for Public Lighting in the City of New York.

Company.	Gas.	Lamp-Post straightened.	Column releaded.	Column refitted.	Lamp removed.	Lamp reset.	New Lamp fitted up
New York.....	17 50	1 50	1 50	3 50	3 50	10	10
Manhattan	17 50	1 50	1 50	3 50	3 50	10	10
Mutual*.....	17 50	1 50	1 50	3 50	3 50	10	10
Metropolitan*..	17 50	2	2	3	3	8	8
Harlem.....	19 50	2 50	2 50	3 50	3 50	8	8
Central..... ...	29 00	1 50	1 50	1 50	3 50	8	8
Northern.....	32 00	1 50	1 50	3 00	3 50	8	8
Yonkers..... .	39 00	1	1	1 00	1 50	8	10

* Schedule.

Brush Electric Illuminating Company, 70 cents per lamp per night.

United States Illuminating Company, 70 cents per lamp per night.

The Gas Commission met at noon on date of April 19th, and awarded contracts for lighting streets, avenues, and public places in New York city, for the year ending April 30, 1884, as follows:

New York Gas Light Company, lamps south of Grand street, $17.50 each.

Manhattan Company, lamps between Grand and 34th street, $17.50 each.

Mutual Company, lamps on certain streets between 34th and 79th streets, and parks between Grand and 34th streets, $17.50 each.

Harlem Company, High Bridge and the streets between 79th street and the Harlem river, $19.50 per lamp.

Central Company, Twenty-third ward, $29 per lamp.

Northern Company, Twenty-fourth ward, except the former town of King's Bridge, $32 per lamp.

Yonkers Company, old town of King's Bridge, $30 per lamp.

Northern Company, former town of West Farms, $23 per lamp.

Metropolitan Company, certain streets between 34th and 79th streets, $17.50 per lamp.

Brush Electric Illuminating Company, Union and Madison squares, Broadway and 5th avenue, from 14th to 34th streets, and 14th and 34th streets, Broadway to 5th avenue, 70 cents per lamp per night.

United States Illuminating Company, Battery and City Hall parks, Washington square, Broadway from Canal to 13th street, and 5th avenue from Washington square to 13th street, 70 cents per lamp per night.

From the report of Secretary McCormick it is shown that one electric lamp displaces 6½ gas lamps. The electric lamp costs $255.50 per year; the displaced gas lamps cost but $110.83 per year. This makes a difference against the electric light of $144.67 per lamp, leaving entirely out of the question the fact that electric extinctions occur with monotonous regularity.

The Petroleum Outlook.

The most noticeable feature in this month's report is the decrease in production, which averages 3,667 barrels per day less than in the preceding month. The decline is found to be in all the districts, none of which have maintained their previous record except the Forest County field, which is a newer district, containing a larger amount of fresh territory than any of the other fields, and is now looked upon by the trade, and found by extensive and actual developments, to be more in regular producing belts and, consequently, a larger output is expected from this field than formerly, when it was looked upon as being merely pool territory.

The shipments of crude petroleum out of the producing regions during the month have been larger than in any previous month since last October, amounting to 1,641,899 barrels, averaging nearly 53,000 barrels per day, leaving only about 6,000 barrels of the production to go into stock daily against some 13,000 barrels per day in February last.

The increase in stock in the producing region during the month was 188,775 barrels, being less than the increase in any previous month since October 1881.

The activity in the field during the month has resulted in increasing the number of rigs building, wells drilling, wells completed, and an increase in the aggregate production of the new wells. And on a recent examination of the whole field it is found that the new work during the month of April is being rapidly pushed, and will show an increase over that of the month of March.

From the data we have already collected for the month of April bearing on the next month's report we feel justified in saying that they indicate a small increase in production, a large increase in shipments, and no increase in stocks.—*Stowell's Petroleum Reporter.*

The Management of Small Gas Works.

By C. J. Russell Humphreys.

[Continued from page 178.]

The selection of coal to be used in the manufacture of gas, and the making of contracts for the needed quantity, offer excellent opportunity for the display of good judgment. In our imaginary works, situated as they are on a water front, we shall be likely to have more mines from which to choose than a factory which can be reached only by rail. We will make the most of this advantage, and endeavor to keep at least two kinds of coal in the shed, so permitting us to use a mixture from different mines. There is more in this matter of mixing coals than many are inclined to think, and it is a subject well worthy the attention of every manager if he is able to get more than one kind of this raw material. By a series of experiments, he will be able to determine the most advantageous proportion of the different classes of coal to employ; for on testing them in different proportions he will meet with results varying from the calculated effect due to each coal carbonized separately. This apparent anomaly is probably due to the fact that some coals give off their gas more readily than others, and thus in using two kinds, one particularly soft and the other very hard, there will be, to a certain degree, an equalizing of the demand upon the heat of the bench during the period of carbonization. There is no section of our subject in regard to which it is so difficult to lay down positive rules as the selection of the coal; for local circumstances will affect this matter to a very great degree. In some instances, a works will be so situated that choice can be made among several of the so-called standard gas coals; under such circumstances there is little chance to fall into serious error. In other cases, two grades of coal are offered—good and indifferent. In such an event, a final decision should be made only by a careful calculation from data obtained by practice. Let us, by way of illustration, suppose we are free to use either a good coal, costing $6.00 a ton of 2,240 pounds, and a poor grade of the same material which we can obtain for $4.00 for a like quantity. The former will give us 11,000 feet of gas; the coke being of good quality, we will have eighteen bushels per ton of coal to sell after heating the retorts, while there will be an additional credit for ten gallons of tar. One bushel of lime will purify 6,000 feet of this gas; the cost of such a measure of lime, with the labor of filling and stripping the boxes, will be twenty-four cents.

From the poorer coal only 8,500 feet of gas will be obtained, and the coke being of indifferent quality we can sell only fifteen bushels per ton of coal; nor can we obtain as much for each measure as for the good coke. The tar will in all likelihood fall below the quantity obtained from the other sample of coal, and the gas will doubtless be twice as difficult to purify.

The cost for the coal and purification per thousand feet will then stand as follows:

First Example.

First cost of coal		6.00
Less 18 bushels coke at 8c	$1.44	
" 10 gallons tar at 5c	.50	1.94
		$4.06

$\frac{4.06}{11}$ = 37 cents, cost of coal per thousand feet; add cost of purification per thousand feet, 4 cents, = 41 cents for the two items.

Second Example.

First cost of coal		$4.00
Less 15 bushels coke at 6c	90	
" 8 gallons tar at 5c	40	1.30
		$2.70

$\frac{2.70}{8.5}$ = 31.7 cents, cost of coal per thousand feet. Add for purification, one bushel lime (at 24 cents, including labor) to 3,000 feet of gas = 8 cents, making 39.7 cents for the two items. To make the statement complete, we ought to add to the last case something for extra labor, because to make a given quantity of gas a heavier weight of coal must be charged, and the stoking of the furnace will also be more difficult. If this labor item were included, it would be found to be policy to buy the more expensive coal.

Of course these are purely suppositional figures; they are only employed by way of emphasis to the advice that when a manager has to choose between a cheap and an expensive coal, he should take nothing for granted, but by careful calculation determine which would be preferable for him, not accepting the results obtained at other works, but making experiments himself. The soundness of this advice will be the more readily granted when it is remembered that the charge for extra labor to be made against the poor coal will vary greatly at different works. Thus, it may happen that the quantity of gas to be made is such that practically no increase in the wages account would accrue from the use of the cheaper material, one man being able to make all the gas even with this drawback. In such a case, as the demand for gas increases, and the necessity for putting on extra help presents itself, the calculation will have to be made anew, for, perchance, it may appear that what was an economical procedure a year ago is such no longer. Again, there are some of our coals which are very rich in gas, but, unfortunately, equally prolific as regards sulphur, and it may be policy in some cases to use such; while in other works, differently placed, the reverse would hold. By way of illustration, take the case of an inland works where the freightage from mines and the cartage would come to $3.50 per ton, and presume that the richer coal produces 11,400 to the ton, while only 10,600 feet of the same candle gas is obtained from a like quantity of the other. The cost of carriage per thousand feet would in the former case be 30.7 cents, while in the latter instance 33 cents would be the figure; so if the extra purification of the richer gas did not cost more than 2½ cents, the first would be the cheaper article. If, on the other hand, the works were so situated that the freight were only $1.75 a ton, the difference in the charge of this item per thousand feet would only be about one cent. Similar considerations will have a bearing on the question of the most profitable proportions of cannel to employ; because, when carriage rates are high, it may be policy to take a large yield from the coal and use enough cannel to bring up the illuminating power, where under other circumstances, lower heats, with a smaller percentage of the enricher, may be the wiser course.

In our works we will use a mixture of Youghiogheny, Westmoreland or Penn, and Kanawha coal, adding in the winter season about 5 per cent. of cannel. Our facilities at the dock for handling this material are such that we anticipate unloading the coal and putting it in the shed for 16 cents a ton. We will have a small hoisting machine at the dock for raising the coal from the boats; the steam for running the engine will be supplied from the boiler at the works. The steam pipe to the dock will be covered with mineral wool.

The text books' advice touching the preparation of the coal previous to charging it into the retorts—to "break the lumps to the size of a man's fist"—may be safely followed provided a small hand is taken as a guide; but as the laborers who perform the work alluded to are usually gifted with rather large fists, it is well to modify the order by directing that the coal be broken into lumps measuring about three inches each way. If the coal is not properly broken up before being placed in the retort, the chances are that considerable gas will be left in the coke at the end of the period of distillation. It is equally important that the coal be in a dry state when used; and the remark needs emphasizing if "slack" or fine coal be used. There is nothing so inimical to good retort house work as wet coal, for, among other evils, the evolution of the steam is sure to bring down the heat of the setting. This brings us to the remark that the coal shed should have a water-tight roof, and sides so built that the storms cannot drive in on the coal. In other words, this material should be fully protected from the elements.

It is important that all the arrangements for handling the coal be such that it may be conveyed from the shed to the retorts with the least labor. In this connection we would mention the practice which obtains in many small works, of bringing the coal into the retort house in wheelbarrows, dumping it on the floor, and then shoveling it into the retorts, as one eminently worthy of becoming obsolete.

We have already indicated the style of coal wagon we will employ—simply a sheet-iron box on wheels; and we think it particularly adapted to small works, because it can be loaded in the shed, drawn to the house, and the coal shoveled from it directly into the retorts. In our imaginary works we will lay the track between the shed and the retort house, with a slight incline toward the latter. When we are running a bench of fours we will load on sufficient coal for the entire charge—namely 1,000 pounds; while, when six retorts are being used, we will make two trips for the required quantity of coal when only one man is on duty. At the time when the day and night men change, and *vice versa*, it will be feasible to put 1,500 pounds on the wagon, as two men can easily draw it, the combined weight of coal and wagon being 2,000 pounds. It will also be well to have an extra wagon load brought in the evening, so as to reduce the night labor as much as possible. Where a retort house is paved with bricks, it would be necessary to lay a track for such a coal wagon as we have described. A cheap and suitable form can be made of ⅜ in. flat iron, 6 in. wide, fastened with heavy 3 in. screws to 6 by 3 in. joice laid on the flat.

Until the demand for gas has so increased as to warrant our putting three men on each shift, we will have to content ourselves with shovels for charging the retorts. These will be ordinary coal shovels, save that the handles are made nearly straight instead of curved. Where the works are of such a size as to employ a gang of three men, it is wise to use the regular charging scoop in place of a shovel. This can be made of No. 14 iron, 6½ ft. in length, 9 in. broad, and 7 in. high. This will hold 125 pounds of coal, or half a charge. It does not pay to make it too heavy; about 55 pounds is a good weight for this size. It will be well, however, to have two scoops, both being filled before commencing to charge. When this mode of handling the coal is employed, it will still be feasible to use the style of coal wagon alluded to; but it will probably be handier to make them smaller, holding, say,

750 pounds of coal, as they can be handled more expeditiously. The scoops can be placed on crutches 15 in. high, while being filled.

Whether the shovels or scoops be employed for charging, we will see that the coal is well leveled off before the lid is put on, and will use for this purpose a tool made of ⅝ in. round iron, 11 ft. long, having a cross-head 9 in. in length, made of ½ in. flat iron, 11 in. long and 3 in. in width.

It is, to say the least, strange that so many of the small gas works hold to the old-fashioned style of cotter bars, which are made to fit into eyes in the lugs of the mouth-pieces, and which have to be removed therefrom each time the charge is made. The fact causes the more surprise when it is remembered that it is a very simple matter to alter the common arrangement so that the bar, instead of being removed, is merely revolved out of the way before taking off the lid. This object is accomplished by cutting away the outer end of one of the lugs and putting a ⅝ in. bolt through it and the cotter bar, thus forming a pivot for the latter to revolve on; the top of the remaining lug is cut away so that the bar drops into the opening. When this plan is adopted, it is possible to secure the lid in position much more quickly than when it is necessary to fit the bar into the eyes of the lugs.

[To be continued.]

[Official Report.—Continued from page 178.]

Thirteenth Annual Meeting of the New England Association of Gas Engineers.

Held at Young's Hotel, Boston, Mass., Feb. 21 and 22, 1883.

THE PRESIDENT'S PRIZE.

Mr. Taber—The committee appointed to revise or modify the conditions of the prize offered by the President for the greatest saving in first cost of gas, make the following report:

That a prize of $50, called the "President's prize," be awarded to the member who shall effect at the works under his charge the greatest saving during the year 1883 as compared with that of 1882, ending December 31, in the following respects:

On the percentage of improved yield of gas per retort from American gas coal, stating percentage and kind of enricher.

On improved yield per pound.

On improved yield in candle feet from average daily yield, by photometer at the works.

On improved yield per bushel coke used, 1 gallon tar being considered equal to one-half bushel coke.

On improved yield per day's labor.

On improved yield per 1,000 cubic feet of gas sold per ton.

The committee also suggest that this Association offer an additional prize of $50 for the best working results shown for the year 1883—the President's prize being for the greatest saving during the year, and the Association prize being for the best working results; and to be open to all competitors.

Mr. Lamson—I do not recall all of the figures, but I think there is an argument which can be used against some of them. A recommendation is made that a prize be awarded to the man who makes the greatest increase in yield per ton of coal. I do not think that is a proper thing to go into. I do not think that the man who makes 5 feet to the pound is giving correct results. If a man should compete for the prize by saying that he had increased the make to 5½ feet, I should say that he was wrong, and that he did not deserve the prize.

The President—So far as I am concerned, I am willing to have the conditions amended in any way to suit the members.

Mr. Taber—In awarding that prize I suppose the percentages would be reckoned on the whole number, and determined by a general average of the general result. If I make 4.95, and another gentleman does not like to go over 5, it will show itself in the candle power, or in some other way.

Mr. Greenough—I move that the whole matter be left to the Directors of the Association. They were discussing, night before last, how the meetings of this Association might be rendered more interesting and instructive. There has been a falling off, in the last few years, in the number of papers presented to the Association. The other associations of the country seem, to a certain extent, to have taken the life out of this one; and there is a hanging back on the part of members in bring their results forward. I very much question whether those two offers of fifty dollar prizes would bring out any great number of papers; and if they did the writers would hardly wish them printed; and they would not become the property of the Association, as they ought, in order to be of any real value to the Association. I am not at all sure, if the Directors of this Association were to offer a handsome prize, in the form of a medal or a large money prize, that any considerable number of papers would be written in competition. If there were, then a committee would have to be appointed to consider the matter, and to determine which of all the papers was the best. This course has been followed in some of the other associations, the prize in some instances being made quite large, so as to make it worth a man's while, after going home tired at night, to think about the subject and put his experiments on paper. There is no doubt that the managers of small works are better able to make these experiments than are the managers of large works. The fact that a man runs a small gas works is no reason why he should not prepare an admirable paper for the Association; and he can do so very easily if he will only take the trouble to think about it. I do not think that the recommendation of the committee fills the bill, or will do anything toward making the meetings more interesting. I therefore move, as an amendment, that the whole matter be left to the Directors of the Association, with power to spend such sum as they may see fit toward rendering the next meeting of the Association more interesting. We have quite a large sum of money in the treasury, and I do not know why we should not put some of it into a prize, if it shall be thought advisable to do so. But I do not believe in trying to spur everybody up to an effort to produce the most extraordinary set of figures that he can, because it is impossible for the Association to verify any of the figures which may be brought in here.

Mr. Spaulding—There may be a wrong impression conveyed by the statement of Mr. Lamson with regard to the yield of gas per pound of coal. He says he would not believe a statement of the production of 5 or 5½ feet to the pound.

Mr. Lamson—I said 5½ feet to the pound; not 5.

Mr. Spaulding—I think the real test is not what you can make from a ton of coal, but what you can sell.

Mr. Lamson—There are all sorts of things to be taken into consideration in this matter. I merely meant to state that I thought it was wrong to offer a prize to a man to do a particular thing, or to come up to a set of questions, one of which I believe is wrong. I believe that it would be wrong to ask any man here to work his results up to 5½ feet to the pound of coal. He ought not to have a prize for doing it. If you will allow me to make the suggestion, I think that the best way is to offer a prize for a general paper on something connected with the business which shall be interesting and beneficial to all who may hear it read. I would suggest that we adopt some such plan as that which is followed in the English Association. Authorize the Board of Directors to offer a prize for some good papers which shall be of interest and a credit to the Association; and let rough copies of the papers which are to be read be distributed among the members in advance of the reading. This is the plan followed in England, and it seemed to me to be a very good one. A member read a paper which had been approved, I presume, by the committee, and found worthy. A number of copies were struck off, and these were held by certain prominent members of the Association. While the paper was being read, these members, having a copy of it in hand, were able to examine it, make their notes upon it, and be prepared to criticize it as soon as the reading was completed; and the reader afterward had an opportunity to reply to the criticisms. There seemed to be a very great advantage in having the members hold these copies. It enabled them to understand the data correctly; to be prompt with their questions and ready with their criticisms; and gave life to the discussion. I think it would be well to try that plan here, and to authorize the Directors to have the papers printed.

Mr. Sherman—As one of the committee presenting this report, I wish to say that I hardly think the offer of this prize by the President is open to criticism. It is hardly courteous to dictate, or even to suggest, the terms upon which an individual member of this Association shall offer a prize.

Mr. Lamson—I do not understand that this prize is the offer of any individual member.

Mr. Sherman—The President of the Association has offered a prize of $50.

Mr. Lamson—Why, then, is a committee asked to report upon the offer of the President?

Mr. Sherman—Because exception was taken to some of the details contained in the printed circular.

Mr. Cabot—One of these prizes is offered by the President and another is offered by the Association. I understand that last summer the President left it to a committee to select the subject upon which the papers should be prepared.

The President—The offer was open to the competition of all members, and the papers when presented were to be referred to a committee to determine the award. I have stated that I am willing to have the prize awarded so as to conform to the ideas of the gentlemen who have made criticisms as to some of the points referred to in the circular. I am willing, if thought best, to leave the entire matter in the hands of the Directors.

Mr. Lamson—I was not here when the committee was appointed, and for want of information as to what had been done I may have seemed lacking in courtesy in criticising the offer made by the President. I was mistaken. I supposed I was criticising the offer of a prize by the Association. I think

the directors should be allowed to offer a prize for other papers, independent of the offer made by the President.

Mr. Sherman—I understand that the crucial test of the value of the papers read in this Association is the use made of the information given, as indicated by the results obtained in our works. We must test theories by bringing them down to the bed-rock of facts.

Mr. Lamson—We do not want simply the results of experiments. It should be understood, in general, what kind of papers would be acceptable. This should be stated by the committee in such a way as to ensure the preparation of papers which would be of real value to the members.

The President—Do I understand you to make a motion that the whole matter be left in the hands of the Directors?

Mr. Greenough—I made that motion, but without intending any disrespect to the President. My motion was that $50 be offered from the Association funds, and that the whole matter be left with the Directors, with authority to offer such a prize or premium as they may think best. This is, of course, independent of the President's proposition. Let the offer of the President stand as it is.

The President—I will leave my offer also in the hands of the Directors, to take the same course as the other prize, and to be subject to the same conditions.

Mr. Lamson—I think that the prize offered by the President should stand alone and independently, and that he should have the credit of the offer.

Mr. Armington—The by-laws require that any papers brought to this Association shall, before being read, be submitted to and approved by the Directors. It seems to me that this settles the whole matter. I do not see the need of any motions respecting the papers. They must, under the by-laws, be submitted to the Directors; and it is for them to determine whether or not they shall be read. Any person may offer a prize for a paper; but the paper must go to the Directors, and they may rule the whole thing out. There is no right to have any paper read here until it has been thus submitted to the Directors.

The President—It seems to me that the gentleman is submitting trouble which is not likely to arise. It was never intended that any paper should be brought before this Association in any other way than that prescribed by the by-laws. When papers are presented they will, of course, take that form.

Mr. Armington—I understood the motion of Mr. Greenough to take such a form that, if passed, it would be merely clinching the language of the by-laws.

Mr. Cabot—Mr. Greenough's motion merely relates to the subjects upon which the papers should be written.

The President—As I understood Mr. Greenough's motion, it related simply to the matter of opening prizes. The usual course is to be taken with whatever papers may be presented in competition for the prizes.

Mr. Greenough—My suggestion was to leave the whole matter in the hands of the Directors, and let them offer a prize if they think best.

Mr. Armington—To test this matter and bring it to a conclusion, I move that the Directors of the Association be authorized, within the next fifteen days, to offer a prize of $500 from the funds of the Association, for the best paper on the manufacture of gas.

Mr. Cabot—I move to amend by inserting $100.

Mr. Greenough—I do not know why we should require it to be offered within fifteen days from the present time. Members will not write papers now which are not to be presented until a year from this time.

Mr. Armington—I want to give due notice.

Mr. Greenough—If the Association wishes any papers prepared, the time to stir up the members will be about next November. I decline to accept the amendment to my motion, which is to refer the whole matter to the Board of Directors, and leave it to them to offer such prizes as they see fit for papers to be read at the next convention. The President's offer has not brought out a single paper. It is thought by the committee that amending it in some particulars will be more likely to secure some responses. I desire to put the motion in such a way that the Directors of the Association shall be authorized to offer such prizes as they see fit, with a view of drawing out a first-class collection of papers at the next meeting of the Association.

Mr. Rollins—I do not know that any amendment is in order, but if it is I would suggest the offering of three different sums as prizes. We cannot all write the best; give some of us a chance to be second or third best.

Mr. Greenough—Let it go before the Directors, and let them adjust the prizes as they think best.

The President—You have heard Mr. Greenough's motion, that the whole subject be referred to the Directors, with authority to act as they deem best. Are there any further remarks?

Mr. Armington—I object to that motion. You are leaving it in the hands of a few men who will be very apt to get together and say that the thing does not amount to anything. I wish it made obligatory upon the Directors to offer the prizes.

Mr. Greenough—How will you amend it?

Mr. Armington—In this way: That the Directors shall, within a certain time, offer a specified sum (you may make it ten cents or seven hundred dollars, according to the funds you have on hand), for the best paper on the manufacture of gas.

Mr. Greenough—I will accept such an amendment.

After some further discussion the resolution of Mr. Greenough was amended so as to read as follows, and was adopted:

Resolved, That the Directors of this Association be instructed to offer three prizes of such amounts as they may see fit, of a value of not less than one hundred dollars for the first, for the best paper offered to this Association at its next annual meeting.

The Association then adjourned *sine die*.

Gas for Lighting Beacons and Buoys.

The system of lighting beacons and buoys with compressed illuminating gas has long since been taken out of the region of the problematical, and may now safely be considered as an assured fact. The Naval Office Department of the United States Government, through its representatives, gives conclusive testimony as to the advantages accruing to the Service from the establishment of this system of beacon and buoy illumination. The following letter, from vice-Admiral S. C. Rowan, U. S. N., to the Hon. Secretary of the Treasury, will show the opinions of those who have had to deal practically with the subject:

TREASURY DEPARTMENT,
OFFICE OF THE LIGHT-HOUSE BOARD,
WASHINGTON, Feb. 16, 1883.

SIR: In response to the resolution of the House of Representatives of February 9, instant, transmitted with department letter of February 10, requesting information relative to the cost of introducing gas for lighting beacons and buoys, and the expense of their maintenance as compared with the system now in use for lighting beacons and screw-pile light-houses, the Light-House Board has the Honor to report as follows:

1. *As to gas-lighted beacons.*—The Board has now in operation in Currituck Sound ten beacons lighted by gas, which is manufactured from oil at one of the stations, and stored under compression at the others.

The period for which it is designed that each beacon shall exhibit its light without attendance is about a month. The cost of the apparatus as purchased and owned by the United States was about $7,500.

The system has now been under test and observation for three years and eight months, and during that period improvements and modifications have from time to time been found necessary in order to increase the efficiency of the lights, which have at times burned dimly and even gone out, and to secure their more continuous and reliable action.

While recognizing the probability that this system of lighting from a central station by means of gas stored under compression at the other stations accessible therefrom will be so developed in course of time as to become of great value for light-house purposes, the Board is not yet prepared to announce the precise form and direction in which this utility will be developed, nor definitely to assign the limits within which its application shall eventually be found economical and advantageous as compared with the ordinary system in general use.

The requirements of the Light-House Service are, first, that the light to be exhibited shall be such as the mariner can depend with absolute certainty upon finding in its proper place; and, second, that with an equal degree of reliability the cost shall be the least practicable.

As the case stands at present time, the reliability, which is the first consideration, has not been as thoroughly tested and assured in the case of the gas beacons as in that of the oil beacon, while economically there has not been as much diminution in cost as would be probably practicable with a larger extension of the system. In addition to the gas beacons in Currituck Sound, the Board has recently approved a project and asked suitable appropriation for the construction of a gas beacon on the Dry Romer at the entrance to New York Harbor. The establishment of this light and its observation subsequently will afford a desirable test of the merits of the two systems of gas lighting now introduced as well as of the cost of maintenance.

The cost of equipping this beacon with the special apparatus incidental to the use of compressed gas to exhibit a light of 36-candle power, for a continuous period of 60 days, is estimated to be about $7,000. Other estimates received put the cost of plant of a six months' supply for beacons of various orders—from the 6th to the 3d—at from $2,000 to $5,500.

For the maintenance of the beacon it is impracticable to estimate. The cost of the gas per thousand feet is not ascertained, and in addition there will be the expenses attending the changing of the cylinders by the light-house tender.

If the United States should construct its own works for the manufacture and compression of the oil gas, the cost would vary, according to estimates received, from about $8,000, for a small plant adapted to supply from 150 to

200 cubic feet of gas per hour, up to $30,000 or $40,000, for a vessel in which all the necessary apparatus and appliances for the production and compression of the gas and its delivery to buoys and beacons could be constructed and transported.

The Board is not yet prepared to submit recommendations as to the immediate or general extension of the application of gas to the lighting of beacons until further experience of its reliability and economy shall have been obtained.

2. *As to gas-lighted buoys.*—There are two kinds, known as the Pintsch and Foster buoys, from the names of the patents under which they are made.

As no action was taken on the Board's recommendation that an appropriation be made to enable the Board to practically test illuminated buoys, it has been unable to do anything of its own motion in this matter except to observe what has been done by others.

The Pintsch buoy, it is understood, has been adopted by certain of the European light-house establishments, and is in full and successful operation in British waters.

As was stated in the Board's letter to the department, of 31st January, 1882, which letter was transmitted to the Senate with department letter of 3d Febuary, 1882—

"* * * A Pintsch buoy was placed in position near the wreck of the Scotland light-ship on the 28th of July last, and was taken up about the 21st of November, during which time the light was not extinguished from any cause. Several gales were experienced during this period, and the sea has been known to wash completely over the buoy and lantern without extinguishing the flame, and from the observations made, the conclusion has been reached that the light cannot be extinguished by the sea breaking over it or from the force of the wind, and that it will show a good light so long as there is any gas in the reservoir.

"The Board has no doubt as to the value of this buoy as an aid to navigation, and considering that it may be used in some localities in place of an expensive light-house or light-ship, it is regarded as being comparatively inexpensive, the cost thereof, admitted free of duty, being from $2,000 to $3,000, according to the size."

In October last the steamer Nankin foundered in the Swash Channel, New York Bay, in the direct passage of large ships coming into New York Harbor. As it was deemed necessary to place a light on this wreck, and as the Board could not make a light-ship available here owing to the narrowness of the channel, it accepted the loan of a lighted buoy from the Pintsch Company, which was placed in position on the 2d November, 1882, and remained until 23d December, giving complete satisfaction, the light remaining at its normal brilliancy during that period.

As to the Foster buoy the Board has not had much opportunity to observe its action. It may be stated, however, that one of these buoys was moored for experimental purposes, by the company which made and owned it, on 30th of September last, near Fourteen Foot Bank light-ship, where it remained until November 17, when it was removed by its owners.

The buoy showed its light for 37 of the 49 days it was on the station, but it had to be lighted 12 different times, and it had showed no light from November 11 to November 17, when it was taken away.

It is not supposed that this is to be considered as a conclusive trial of the Foster buoy, but thus far it is the only trial it has received under the eye of the employees of the Board.

It is understood that the United States Beacon Light and Signal Company, of Philadelphia, offered to furnish the Foster buoy, carrying a light of 10½-candle power, with a gas capacity running from 4 to 12 months, at prices ranging from $2,000 to $3,600, and that it will furnish the gas needed to operate the buoys at the rate of $2.00 for each month's supply, the Board to receive the gas and charge the buoy at its own cost.

The Board has no other recommendation to make in this matter than that contained on page 9 of its annual report for 1882, viz:

"The Board during the year has given much attention to the subject of lighted buoys. For several years past illuminated buoys have been successfully used in European waters, and have proved to be such valuable and comparatively inexpensive aids to navigation that they have been permanently adopted by the light-house establishments of Great Britain and Ireland."

What Pennsylvania Pays her Miners.

The Bureau of Statistics at Harrisburg, Pa., furnishes the following figures: The total number of persons employed in bituminous mining was 40,136, and the amount of their wages for the year was $18,775,553. Allegheny county heads the list of 26 counties in the number of collieries and coal products; Westmoreland follows, then Fayette and Clearfield. In coke product Fayette leads, with more than half the coke ovens in the State. Westmoreland comes next. These two counties have 10,063 ovens in Pennsylvania.

Mayor Carrington of Richmond, Va., on the Gas Supply of that City.

It is somewhat surprising to be able to state that there is to be found one Mayor at the head of municipal affairs in one city of the Union who is disposed to be fair-minded in his dealings with an establishment for the manufacture of gas. The case under consideration loses a great portion of its novelty, when it is remembered that the Richmond (Va.) Gas Works is controlled by the town authorities; but, nevertheless, the town authorities can by no manner of means be induced to believe that a works which was originally constructed to manufacture 300,000 cubic feet in 24 hours, and which has since been called upon to supply 550,000 feet in the same space of time, should ever need enlarging. The "corporate mind," whenever an appropriation is asked for, can only discover in such a request some scheme which has for its object the enriching of the builder who secures the contract.

In our issue of March 16, we stated that the Board of Common Council, of Richmond, Va., on March 5, had granted an appropriation of $25,000; the said $25,000 to be expended in the remodeling and extension of the existing gas manufacturing plant. That the Common Council did pass such a resolution (by a vote of 23 for to 6 against) was true; but it appears that the action of the Common Council requires to be ratified by a two-thirds vote of another branch of the city goverment. This consent was not obtained, and the matter still hangs fire. Mayor Carrington's letter shows that he appreciates the situation, and it seems to us that the arguments which he employs to sustain the position he takes should convince the municipal "Solons" of Richmond that the only "joker" concealed in the appropriation asked for is that the citizens of that place may be enabled to abtain a plentiful supply of light at a reasonable cost. The letter is as follows:

MAYOR'S OFFICE, RICHMOND, VA.,
April 9, 1883.

To the Honorable Members of the City Council:

Gentlemen: In the prolonged and vigorous discussion which has been going on in your respective bodies concerning gas, the best material for manufacture, and the parties who should make it, I had hoped not to have been called from my official silence, until your decision in one way or another demanded my action. There seems no prospect of agreement in time to avail for the approaching increased demand for consumption this fall and winter, unless youare awakened to its stern necessity; and as in my solemn judgment the exigency has arisen, my duty to the people forces me to break the silence I have so far observed.

From the known capacity of the works, from the constantly increasing demand for gas, and the terrible strain to which the present fixtures have been put to supply the present demand, my own judgment told me we were in peril of being unable to meet the necessities of the coming winter as to light, unless we prepared for enlarged manufacture.

But I desired to back my own judgment by the opinions of those who knew better than myself, and so I demanded of the Superintendent such information as I needed; and the facts he states confirm my worst fears, and convince me that you even now have scarcely time to avert the calamity to our people and the disgrace to our city of threatened darkness in our streets or in our houses in the coming fall and winter. You can of course, light the streets and leave the dwellings without it, but what good is light in open streets to those who are thereby guided home to be annoyed by dirty tallow-dips or oil in lamps? Or if the houses are lit while your streets are dark, what comfort is there indoors while lives and property outside are covered in darkness to shield the lurking plunderer?

You owe a better state of affairs to your constituents, and while you control the means of lighting houses and streets, it is your bounden duty to furnish the comfort in this line for which they have so patiently paid so high a price.

It will not do to rely on the hope that the present works will manage to bear us through another winter, as they have unexpectedly done through the past season, because, if an estimated, proper capacity of 300,000 feet per day, strained to a manufacture of over 500,000 feet per day to meet the demand, was not a warning of the peril we run by such reliance, we should remember that such a strain continued could not be endured much longer, but like anything overworked, must finally break down or materially weaken in its working power.

Whose fault is it that this peril is staring our people in the face? It is yours alone, for you can remove it in some way by providing the means. It is no defence to say, one to the other, that coal or water gas is the best, and let the people suffer in paying exorbitant price, in getting inferior gas, and being threatened with darkness in the near future, because each cannot carry his preference on that point!

You have gas works; you have power over its manufacture and its manufacturers; and whether the quality is bad, or price is high, or supply is deficient, the people have a right to hold you responsible, because you have power to rectify what you have power to control.

All who have proposed to buy or lease your works, or furnish gas by contract, have confessed themselves as mere speculators, looking to their own gain more than to yours or that of the people, because each in turn has pleaded his first offer one of economy to the city, and at the most reasonable figure possible; and yet, each in turn, as pressed by some rival, or the promise of our own officers, with lower cost of making gas, has reduced his first bid (and sometimes more than one bid) by very large amounts. Thus, as to how or of what gas shall be made the question stands, that you have over $1,000,000 in gas works under your own control, now fitted to make coal gas, and which with old appliances and no improvements has furnished gas at a profit on the current outlay, and which promises with new improvements (at a cost not exceeding $25,000) to reduce the cost of manufacture, improve the quality, and increase the quantity of gas to the desired extent.

Which is the wiser, where you cannot agree, to place your gas property of $1,000,000 in foreign hands that confess a speculative bent on a mere nominal bond (compared with the amount at risk), or to put $25,000 more upon your own property, managed by those you control, and whose word has always been found sufficient bond for faithful and efficient work? Why should those who come with new inventions from abroad be entitled to more faith than our own people? They, and your own officers, promise enough gas, good gas, and cheaper gas on certain stated conditions.

The word of each is all you have; why not trust our own as the safer of the two? If the latter fail you can then put them out at pleasure, because they are of your own creation. If the former fail you have no resort, except to law, with its costs and delays, and the peril to the plant, of more than $1,000,000, now in your gas works. Prudence and wisdom would seem to suggest that you try the pledges of your own officers, and hold them to the pledges they have made; the risk is but a trifle compared with the other plans.

Delays, discussions and disputes once brought us to the verge of very dire results in a water famine. I believe there is danger of equal lack of light this winter, unless you speedily prepare to avert the calamity, which I beg you to do.

The people have a right to light; they have a right to light at a fair cost. You have the promise of improvement in quality and quantity and reduction in cost of making it from those you can control, and whom it is your duty to require to prove their capacity by keeping their promises.

I send herewith the letter of John H. Knowles, Superintendent of gas works, which sustains my fear as to the future of our gas supply, unless you act at once. If our gas makers and managers are worthy and competent, we should heed them; if they are not, there should be nerve enough to displace them. For my part, with the old apparatus they have had, I feel that our Gas Department has accomplished wonders.

But my only purpose is to warn you of the threatened want of light, and to entreat you to relieve the people of the danger of such result and to prepare for such improvements as will give them light at properly reduced price.

Respectfully,

W. C. Carrington, Mayor.

The letter of the Superintendent, John H. Knowles, states the calculated capacity of the works at 300,000 feet per day; that they are producing 550,000 feet per day; that every piece of producing apparatus was kept at constant work; that demand for gas was rapidly increasing, and the works could not supply the demand the coming winter unless they were improved or enlarged.

[Since the above was put in type the Council have decided to grant the appropriation ($25,000) asked for, and immediate steps will be taken to place the works in a condition to meet the increased and increasing demand for gas. Mayor Carrington, and Messrs. Higgins and Knowles deserve great credit for their perseverance.]

The Detection of Gas Leakages.

Herr C. von Thau contributes to the *Journal fuer Gasbeleuchtung*, a paper descriptive of two instruments for estimating and discovering gaseous mixtures in air. The following condensed account with illustration, is taken from the *Journal of Gas Lighting*:

The first is called a Diffusiometer (fig. 1), and shows the proportion of illuminating gas exising at any time as a mixture with air. A porous earthenware cylinder *a* is closed with an india-rubber stopper. By means of a perforation of the stopper, which rests upon the table *b*, the pipe *c* is put in communication with the interior of the tube. This pipe is closed at the bottom, but is connected at one side, by the india-rubber pipe *d*, with a gauge *e*. The leg of the gauge is filled with litmus water. The vertical part of the gauge is 8 millimeters in diameter, and is divided in millimeters, with the zero point at the water-level. The calibration of the instrument is thus effected: A 5-liter gasholder is to be half filled with air, and 100 cubic centimeters of common gas introduced therein. A plate of glass is then slipped under the bell when it is nearly drawn out of the water, and the contents lifted and shaken together. This process quickly and thoroughly mixes the air and gas, and the compound may then be applied to the porous cylinder by inverting the gasholder over it. Immediately the action of diffusion causes the water in the gauge to rise, and in the course of from 5 to 10 seconds it reaches the maximum, which is marked. This is the 2 per cent. line, and similar proceedings with 250 and 500 cubic centimeters of gas in the same mixing vessel give the 5 per cent. and 10 per cent. data. The diffusive action through the porous cylinder is so quick that in half a minute after the gaseous mixture has been removed the water in the gauge falls to its normal level. The purpose of this arrangement is to give warning of the presence of an explosive mixture of gas

Fig 1.

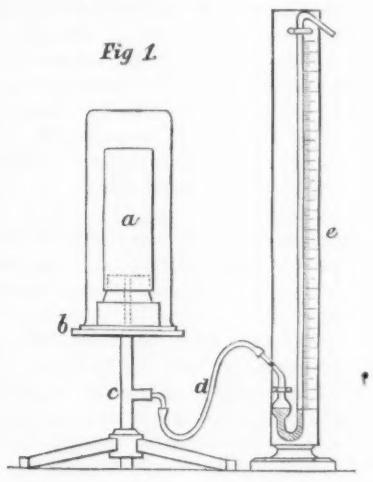
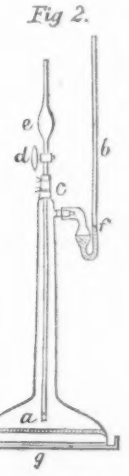


Fig 2.



and air in close apartments. The second figure represents the other apparatus designed by Herr von Thau, and called a Diffusioscope, which is intended to facilitate the discovery of leaks in gas mains or pipes. A glass tube is fixed in a very much flattened funnel which is closed at *a* by a porous but otherwise air-tight diaphragm. A capillary guage *b* is connected by means of a cock inserted in the side of the funnel as shown. The upper end of the funnel-shaped stand is fitted with a tube *e*, provided with a cock *d*, and connected at *c* with an india-rubber cap. In use the cock *d* is first opened for a short time, to establish equilibrium of pressures. This cock is then closed, the cover *g* (usually kept on the bottom of the stand) removed, and the funnel is held over the suspected part of the gas main. Wherever there is a leak the gas collects under the porous plate, diffusion commences, and the gauge rises. To clear off the contained gas the gauge is taken off, and the cock *d* opened for a moment, when the instrument is ready for a new trial. When the delicacy of the apparatus is increased by the use of a diffusion diaphragm of large area in conjunction with a very small gauge, it is possible by it to discover leaks too small to ignite.

[From the London "Journal of Gas Lighting."]

Twelve Months' Experience in the Distillation of Coal Tar.

Mr. J. J. Jervis (New Swindon) read the following paper at the late meeting of the Southwest of England District Association of Gas Managers:

I shall be sorry indeed if the title I have chosen has raised expectations which my paper may fail to satisfy; for there may be some present who know far more than I can tell them of the chemistry, etc., of tar distillation—and without the twelve months' experience—while others may be expecting to learn somewhat of the chemistry of the several processes. But I was assured that my paper was simply to introduce the subject of tar distillation by gas companies; and it is with great pleasure that I now bring the matter before you.

In a letter addressed to me a short time ago, our Secretary—very much to the point, as I thought—contended that gas engineers must now look all round in the glare of the electric light to secure to themselves every means of profit, however small. He fixed on the production of more ammonia per washer; and I for some time have thought about tar. Why should we sell our tar any more than our ammoniacal liquor? Of course I know, owing to local circumstances, some companies are obliged to sell both; but many companies could work up their tar to advantage. Then why not work it up? The answers to this question may be various—no room, nuisance, danger, complicated processes, markets, bad locality, expensive plant, does it pay? etc., etc. All these are certainly considerations, but I think there is a time coming when this residual will have to be worked up by gas companies, if they are obliged to fall back upon residuals so much as they do at present. For when one considers the large amount of tar products (and ammonia also) that is being put into the market by the growing manufacture now being carried on at the pit's mouth, and also the increasing quantities from the manufacture of English petroleum, we must expect the markets to be soon affected to the prejudice of tar distillers. More products for sale will necessarily reduce prices, and buyers of tar will not be able to pay so high a figure for the crude article. Gas companies will either have to lose somewhat, or work up their tar themselves, and with at least the carriage cost as a margin

or set-off against the low ruling of the market. I do not propose to take up *seriatim* the several considerations I have mentioned; but I hope, from the description I may give of our little tar works, that some of the foregoing points may be touched upon.

We were conscious from the first that for the disposal of some of the products we were badly situated (as, indeed, are many distillers); but, believing we had still an opportunity of doing better with our tar by working it up ourselves, we decided to erect the necessary plant, of which I shall be pleased at any time to allow an inspection by my brother managers. The premises being of very limited area, and closely surrounded by houses, we were obliged to purchase a site at considerable distance. This was not altogether against us, because of the railway conveniences. We purchased the whole of the field, 5½ acres, but the works occupy only about three-quarters of an acre. Our own stuff is hauled into the works; but we receive tar and ammoniacal liquor from other gas works, and the trucks or tanks on the rail alongside discharge into the wells. The tar is allowed to stand for some hours, to permit as much water as possible to separate; otherwise that in the still would have to be driven off at the expense of time and fuel, as well as forming one of the dangers of distillation.

The still is charged by the steam pump in the boiler house, which pump also fills the ammoniacal liquor settling-tank, loads up creosote, etc. The still is known as a "balloon" still; and 1,000 gallons of tar is the charge. From the still-head is lead a 4-inch pipe, which passes three times round a tank filled with water, and conveniently arranged for maintaining the required temperature. This tank is raised on brickwork, forming the grease-house; and there is a platform leading from it to the various tanks and receivers. A gallery is also erected round the still, for easy access to the manhole, spyhole, inlet for tar, etc. Firing is started about four o'clock in the morning, and in from two to three hours there begins to come over, from the spout of the condenser, water and the first light oil, and for the space of about three hours more it flows in a steady stream. This is all received, without separation, into a vessel. In our case it is simply a 200-gallon cask, set up on brick piers, which serves as a very good naphtha still. This I will describe presently. (I am giving you now, with a description of the apparatus, the routine of one day's work; after which I will detail the duties of the following day.) Whilst the naphtha is coming over, a slight odor is perceptible, but it is not at all disagreeable; and throughout the entire process the smell is far more tolerable than burning out an ascension-pipe or changing a purifier.

During the whole of the five or six hours very careful attention is directed to the firing, as the tar is apt to rise—as milk does when boiling—and come over. When the boiling point is reached a peculiar rattling sound is heard; and according to the quality of the tar so is the distillate that comes over at this stage, whether a second light oil or creosote. If the latter, a difficulty may arise in a sudden choking of the worm, in which case a steam pipe handy is of great service. But if a second light oil comes over, it is received into the same vessel as the first runnings. In about an hour, and upon reaching a certain point (determined either by catching in a glass some of the distillate and observing the separation of the liquids, or by the specific gravity test), the trough is directed to the creosote tank. The firing need not now be so vigorous; and, to a great extent, danger from this cause is at an end. A copious stream comes over for about three hours, and a rough test is applied by simply catching a few drops on a piece of hoop iron, and observing the congelation and color. If the distillate is of a peculiar greenish hue and sets quickly, the trough is changed to the tank for receiving the anthracene oil, which for about an hour runs over in a small dark stream. The tests marking the fractions may be elaborately and scientifically made; but in our practice they are all more or less rude. You are aware that, in many processes, the simple test of the workman is very often more reliable than the complicated one of the man of science. When by a recognized setting, and the hue of a few drops of liquid on a piece of hoop iron, the desired point of distillation is reached, the fire is drawn and the contents of the still—hard pitch—left for the night to cool. To run it out at once, except into a securely closed vault, would be a dangerous operation, as it would ignite on exposure to the air. Early the next morning it is ready to be run out into the cooler. In our case this is an old Cornish boiler minus the tube, and fitted with a sluice. This chamber is fairly air-tight, and reduces the temperature a little; after which, if hard pitch is required, it is run at once into the portion of the pitch-bay devoted to this quality. But if a medium or soft sample is required, the hot pitch is discharged into a shallow brick tank covered over with sheet iron plates; and when further cooled by standing five or six hours, given quantities of creosote salts or green oil are cautiously added and well stirred. The liquid is then ladled over into the soft pitch compartment, where it sets on cooling. Or should it be required to make black varnish or refined tar, certain quantities of naphtha, creosote oil, or green oil are added, according to the qualities desired, and the products pumped up into the store tank or put into barrels.

Now let us turn to the naphtha, etc., received into the small still for rectifying. Brought to boiling point by a steam pipe, the vapors are condensed in a 2-inch worm in the same tank as the tar-still worm, and the naphtha and water coming over are received without separation into a tank. Our practice is to run into this vessel up to what will give a 50 per cent. benzole at 120°, and then to finish off into another tank with what will give a 20 per cent. benzole at 160°. The water in both these tanks is conveniently drawn off by a cock.

Turning to the creosote (as we have found it does not at present pay to make carbolic acid), we do nothing further with the creosote except to fish out the salts that settle. These we have sold as a fuel for steel puddling furnaces, and we use them also for lighting up the boiler fire and other purposes.

The anthracene oil, having resolved itself into a dark heavy oil, and thick with a greenish powder, is drawn off and put into filter bags (we have no filter press at present). When fairly free from oil it is pressed under the hydraulic, afterward warmed up in a steam-jacketed pan, and re-pressed. We thus obtain a sample of about 40 per cent., and without washing with naphtha. With the oil we make a cart grease, the apparatus and process being exceedingly simple. We have a very fair demand for the oil as a lubricant in brick presses, etc. It is also a capital oil for exhausters; and being so good a solvent for tar, any clogging is instantly removed.

I have now given you, as simply as possible, an outline of the duties of our tar works, purposely avoiding all technical terms, chemical formulæ, etc., so that you may see that to work up tar is not a formidable matter—not more so, I think, than the sulphate process, and not nearly so much so as gas making. But I must not, I know, rest here. You want another view of the matter—results. I therefore give you a few figures—not the exact ones of our working, for certain reasons; but they are, I assure you, near enough not to mislead.

We make the products of 1,000 gallons of tar to be—

40 gallons "once-run" naphtha, (yielding a 50 per cent. benzole at 120°) at 4s. per gallon....	£8	0	0			
Less carriage and barrel..	0	8	0			
				£7	12	0
20 gallons "second runnings" (yielding a 20 per cent. benzole at 160°), at 1s. 3d. per gallon...	£1	5	0			
Less carriage and barrel.	0	8	0			
				0	17	0
250 gallons creosote, at 2¾ per gallon.....				2	17	3
100 gallons green oil, at 4d. do.....				1	13	4
¾ cwt. anthracene (40 per cent.) at 1s. 6d.....	£2	5	0			
Less carriage and barrels.....	0	7	0			
				1	18	0
3½ tons pitch, at 25s. per ton.....				4	7	6
Total.....				£19	5	1

On the other side—

1,000 gallons tar, at 2½d. per gallon.....	£10	8	4	
Fuel, 7½ cwt., at 8d. per cwt.....	0	5	0	
Labor—Half of two men's wages for one week for all duties, two stills per week.....	1	5	0	
Total.....	£11	18	4	

Net result (say) £7 per 1,000 gallons.

You have, of course, noticed that there is no item for wear and tear of still, tools, and sundries; but I have not put anything on the opposite side for the better profits on the by-products—black varnish, grease, etc.—which work into a very good trade. And I ought also, in our case, to make a set-off on the labor account, on account of sulphate work in connection with our tar works.

If I now give you the approximate cost of the plant you will, I think, see that the matter is worthy the attention of gas managers:

Cost of tar settling-tanks.....	£60
Boiler house and stack, boiler, filters, press, pump, etc., etc..	500
Still, brickwork, and stack.....	100
Pitch cooler and bay	35
Condensers, etc.....	25
Various tanks.....	80
Sundries	20
Office, etc.....	30
Total.....	£850

Add cost of site (say £1,000 to be sure of the mark), and with such a plant there could be worked up 100,000 gallons of tar per annum. The sum realized would be fully ample for charges of wear and tear, sundry charges, superintendence, depreciation, reserve, dividend, etc., besides leaving a good margin for variations in the markets. I have thus given you sufficient to enable you to apply the matter individually. In some cases the cost of the works might

be considerably less, working expenses less, and sale of products more. Some of you may get more than 2½d. per gallon for your tar; others considerably less. So you see that it is a very difficult matter indeed to lay before you such an absolute statement as one would like to do. Still, I hope by next meeting others will have gone into at least the figures, that I may have something to compare with what we may do during the next six months. Then, if desired, I shall be glad to place before you further experience, with more statements, and something of the chemistry of the subject.

Gaseous Fuel for Boilers.

A late number of *Iron Age* says that, in some particulars, the use of gaseous fuel under boilers has been a well-established practice for many years. Waste gas from blast-furnace stacks has been thus employed from a very early day in the history of the iron manufacture in this country. This water gas cannot compare very favorably with the gas which would have to be furnished for general public use as a fuel gas, for, apart from its absolute chemical composition (which alone would bar it from such use), it carries with it from the interior of the furnace a fume or fine ash, which is very persistent in its refusal to be washed or filtered out. Hence all, or nearly all, the details of the boiler house at blast furnaces are changed from what is found to be desirable and economical in other general use. The boilers themselves, in the large majority of cases, are comparatively small in diameter and very long, the external surface of the shell alone being used as heating surface. The difficulty—nay, impossibility—of cleaning them thoroughly from this light, flocculent dust prevents the use of any tubes or other form of internal heating surface, so that even for a moderate total capacity of boilers the plant becomes quite extensive, with the needful lines of pipes for steam, for feed-water and for blowing off.

Hence, in the introduction of gas for general heating purposes in factories, and in similar places in which the demand would not be so great as to reach beyond the probable capacity of a public works for its supply, the problem opens itself as a fresh, almost untrodden, field to the engineer. The list of devices for burners and for supplementary fixtures for gas furnaces is already an extensive one, but the actual use, on an important working scale and under rigid conditions which a meter-measured supply of gas would compel, is very limited. The ingenuity of designers will therefore be sure to be drawn upon again to a certain extent in the former lines, but the chief requirements, to which their work will undoubtedly be held very rigidly, are certain to lie in the direction of very close economy, or, more correctly, in the direction of providing for an exact knowledge of the work done, which, as has been so often said, is the foundation stone in such matter of all economical working. Some of the childish disputes as to the quality of coal furnished will be relieved when gas is brought in from works sending out a product measured by millions daily, and so, also, will there be an end to the statements, which are pretty hard reading even in an advertisement, that waste heat can be utilized under a boiler after the "Siemens method" of melting steel.

Street Lighting in Hartford, Conn.

An electric lighting company wants to get into Hartford, Connecticut, and the matter of their application is now before the authorities of the city. On the 1st of December last, as previously announced in the JOURNAL, the Hartford Gas Light Company reduced the price of gas to private consumers to $1.90 per thousand. On the 1st of January the company agreed to supply the gas for street lighting and public buildings at $1.80 per thousand.

The city's street lamps are equipped with 4 feet burners, and are lighted on 330 nights during the year—the total number of hours in lighting schedule for each lamp per annum amounting to 3,457½. From this it will be seen that each lamp consumes 13,831 cubic feet per annum, making the cost of gas for each lamp equal the sum of $24.88. To this must be added the sum of $7.56, which is expended in cleaning, lighting, repairing and maintaining; making the total cost of each lamp to the city equal to $32.44 per annum.

CHEAP GAS IN ST. LOUIS, MO.—The reduction in price of gas by the Laclede Gas Light Company of St. Louis, Mo., to $1.50 a thousand has had the very natural effect of largely increasing the send-out. The company anticipate having a very great demand made upon them for gas for cooking purposes during the summer season. Indeed, the calls for gas stoves are already very numerous. The water gas people are going ahead with their works, and are busily engaged in "pipe laying." They are adepts in this sort of business. The stock of the St. Louis Gas Light Company is quoted at $282, and shows no symptoms of weakening. While the consumers are at present highly delighted over the turn which affairs have taken, it remains to be seen whether the final result will not be the same old story.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

IMPROVEMENTS AT THE WHEELING (W. VA.) GAS WORKS.—Some time since the Trustees of the Wheeling (W. Va.) Gas Works had the conclusion forced upon them that the old manufacturing establishment had outlived its usefulness and capacity, and determined to apply to the Council for authority to make the alterations and additions necessary to meet the increasing demands of consumers of gas. The Wheeling works are owned and managed by the town authorities; and to the credit of those in charge of municipal matters in this place it must be said that no sooner did the Trustees apply for the desired authority than it was cheerfully granted. Last fall the Trustees entered into contract with Mr. William Gardner, of Pittsburgh, Pa., to furnish and erect all the latest improved gas machinery necessary to complete a new sixteen-inch works. The work of Mr. Gardner has been most satisfactory. He carried out the letter and spirit of his contract without quibble, and the Trustees have accepted his work and express themselves as highly pleased with the results attained.

The retort house plant embraces three benches of sixes, erected and fitted up under the style and fittings of the system known as the "Pittsburgh setting." The retort house is covered with a wrought iron trussed roof, with ventilator, angle iron purlins, and cast iron gutter. The machinery consists of one horizontal boiler and one upright boiler, both rigged and fitted out in the latest modern style. There is one rotary exhauster and engine, with all the necessary 16-inch connections. The capacity of the exhauster is 700,000 feet every 24 hours. There are two multitubular water condensers, with 16-inch by-pass connections, with one 16-inch blank outlet for an additional condenser when the make shall demand its erection. Each condenser is 17 feet high, and has 222 two-inch tubes, with water connection and overflow pipes. The capacity of the condensers is 800,000 cubic feet each 24 hours. One "Standard" washer-scrubber, of 500,000 feet capacity, with engine and all necessary steam connections, has been placed in position. The purifiers are four in number, of cast iron, the dimensions of each of which are 18 by 22 feet, by 38 inches in depth, fitted with four wrought iron covers, holding-down clips, etc., and four layers of ash lime trays to each box. Each purifier rests on three bars of 6-inch channel iron, supported by six cast iron columns. Also, one 16-inch center seal, with rotary wheel and pinion, tar reservoir and syphon. Connected with this department are two hydraulic lifts for raising and lowering the purifier covers, having lattice girders with carriage. The purifiers are calculated to purify 1,400,000 cubic feet each 24 hours. The station meter, with meter by-pass and all necessary 16-inch connections, was made and erected by Helme & McIlhenny, of Philadelphia, Pa., and will pass one million cubic feet each 24 hours. A large portion of the machinery was constructed by the Kerr Murray Manufacturing Company, of Fort Wayne, Ind.

Superintendent James M. Dillon, to whom great praise should be awarded for his energy in the matter of the new works, had a watchful eye over the progress of construction, and feels very justly elated over the appearance and working of the new establishment. The cost of the structure and equipments approximates $40,000. It will be readily seen, from the following figures, that the price of gas in Wheeling is very low, and Mr. Dillon thinks that the lowest figure has not yet been reached. On July 1st, 1875, the price of gas was reduced from $2.80 to $2.30. On March 1st, 1877, it was further reduced to $1.80; and the last reduction, which was made on January 1st, 1879, lowered it to $1.20, with 10 per cent. off for payment within ten days after the the rendering of the bill, which virtually makes the present price $1.08 net. In 1881 67,594,600 cubic feet were made. This year it is estimated that the production will reach 100,000,000 cubic feet. The total revenue for last year was $92,529.61, to which must be added the value of gas burned by the city in its street lamps and public buildings, and for which no charge is made. In 1881 the public lamps consumed 1,225,900 feet, and the public buildings, such as the city hall, police stations, engine houses, etc., used 5,911,632 cubic feet out of a total output of 67,000,000 cubic feet for that year. In 1879 there were 1,800 consumers, and to-day there are 2,500. The Trustees under which these improvements have been made are, Dr. T. H. Logan, President, and Messrs. Robert Simpson, and Thomas E. Lewis.

It is to be hoped that the Richmond (Va.) people will take counsel from the excellent example set by the Wheeling folks, and instead of seeking to delay and retard progressive action, do what they should have done long ago—go ahead and extend their works, in order that the people of the city may enjoy the blessings of a plentiful supply of cheap gas.

MR. LYMAN P. GEROULD DOES THE "HONORS" AT MANCHESTER, N. H.—Manchester, N. H., is a living example of the sturdy vitality which animates the residents of the Eastern States. The rapid growth of Manchester's population caused Mr. Gerould and his associates to see the necessity which existed for prompt action in the matter of increasing the capacity of the works under their management, in order that they might be enabled to supply the

great demands which were being made upon them for "more light." A year ago a comprehensive system of extension and alteration was decided upon, and on April 12th the arrangement of the new order of things was accepted as completed. The new buildings comprise a length of 134 feet and a depth of 36 feet, the portion allotted to the purifying department being two stories in height. The new purifying boxes were furnished by Davis & Farnum, of Waltham, Mass., and the purifying capacity is double that of those formerly in use. A feature in the arrangement is the doing away with the common center seal. The boiler room, condensing apparatus, and, in fact, the entire arrangement of the works, has been extended, altered, and improved in every particular. Manchester can now boast of a works with a daily capacity of one million feet. The improvements are of a solid and substantial character, and the matter of cost was at no time allowed to stand in the way.

In order that the affair should be properly commemorated, Mr. Gerould decided that the most correct thing to do would be to invite the gas fraternity to make a visit of inspection to his new establishment. He accordingly issued invitations to the gas men of New England (and, by the way, some of the "invites" found their way to New York and other localities) to come and "see him" in his new quarters. The "summons" was made returnable for Friday, April 13. Never before did the dreaded subpœna meet with more ready acquiescence or more ready acceptance, and never before was a jollier set of judges, jurors, and witnesses gathered together in one spot. The scene of the crime being duly inspected and examined, the great array of legal and lay talent, upon "strict justice bent," repaired to the dining-room of the Hotel Windsor; and no justice was ever dispensed with greater blindness and impartiality than the justice done the excellent banquet which was tendered the guests of the Manchester Gas Light Company on the afternoon of April 13. The gathering was large and representative; and to enumerate those present would occupy a column of our space. We tender our congratulations to Mr. Gerould and his associates, and entirely concur in the verdict of the jury, that the "Manchester affair was a great success."

Caution—Look Out for Him.—Quincy, Ill., April 18, 1883.—"I deem it a duty to put the gas fraternity on its guard against the seductive wiles of a dead-beat who is traveling over the country under the various names of Morris, Wilson, Wilkerson, and I know not how many other aliases; and who hails from London, Canada. By his simple and homely, yet plausible, manner, he has been successful in borrowing small sums of money from a number of superintendents of gas companies, with the avowed object of securing sufficient funds to pay his passage home; but, so far as heard from, he has not yet arrived at his pretended destination, and probably has very excellent reasons for being in no particular hurry to do so. In person he is about five feet eleven inches in height, of large frame, with shoulders slightly bent, sandy hair and beard, with complexion to match, and is of foreign nationality—Scotch, I think. He claims to have been a superintendent of gas works, now out of a situation from no fault of his own, knows enough about the gas business to discuss its details intelligently, and purports to be the possessor of several recipes of value to gas managers, notably one for the decarbonization of retorts, with which he is willing to part for a small consideration.

I feel perfectly justified in pronouncing the above described individual a fraud of the first water, and respectfully caution all whom it may concern to be on the look out for him. A. W. Littleton."

Some Account of the Doings of a "Gas Meter Expert."—Mr. Wm. Wilsdon, whose latest place of exploitation appears to be Philadelphia, Pa., has gone into the meter testing line as an "expert." The peculiar beauty of Mr. Wilsdon's position is that he goes it alone, and is not troubled or hampered in any manner by official restrictions of any kind or character. While this state of things may have given him a little more leeway in the past, it is just possible that the freedom of the past will produce for him a troublesome crop of thorns which will require reaping in the near future. The following, from the Philadelphia *Times*, will show our reasons for supposing that there are thorny paths in the direction in which Mr. Wilsdon is traveling:

"Six per cent. rebate on gas bills averaging $15,000 per annum, from July 26, 1880, to February 19, 1883, is claimed by Kingsley & Co., landlords of the Continental Hotel. The claim was the subject of consideration by the special committee on distribution of the Trustees of the gas works, comprising Messrs. Gardner, Moore, and Lane, on a late date. In a communication addressed to the Trustees embodying the claim, Kingsley & Co. state that upon July 26, 1880, two 100-light meters were placed in the hotel, and remained there until February 19, 1883. Early in February they had obtained a test of the meters by Wm. Wilsdon, an alleged expert tester of gas meters, and he discovered that the meters had recorded about 7 per cent. more gas than had actually been consumed. Mr. Brown, of Kingsley & Co., was present, accompanied by the alleged expert Wilsdon.

"'Are you a sworn meter tester?' asked Mr. Gardner.

"'Well, now, look here. You see, it isn't necessary for me to be sworn. I am always sworn' pointing to his breast, 'to stick to the truth.'

"'I have just come in,' said Trustee Wm. H. Smith, 'but I have heard your declarations of truthfulness. Did you say in the *Star* office, when you were making a test there, that the Gas Trust had made a rebate of $950 to the Continental Hotel on the strength of your tests?'

"'Well, now, look here. I—my man who helps me was there, and he sometimes gets mixed up. He has a short memory.'

"'Did you not say that you were backed by Trustee Gardner in your work as an expert meter tester?' Mr. Smith continued.

"'Well, now, look here. I don't remember having had any conversation with Mr. Gardner. I might have said that Mr. Gardner, being an honest man, would say I was right. You see, I have a man who gets mixed—'

"'Did you ever see me before?' interrupted Mr. Gardner, abruptly.

"'Well, now, look—'

"'Yes or no,' thundered Mr. Gardner.

"'No, sir; I have not,' he replied.

"'That's right. I have never seen you before. You understand, gentlemen?' said Mr. Gardner, addressing those present.

"A desperate attempt to get an account of the test from Wilsdon was made by Mr. Lane. Each question asked was met by the inevitable 'Well, now, look here,' and a general floundering among every variety of topics except the one subject of the inquiry. Mr. Lane was very patient with the man, but he at last asked, in a fit of desperation, 'Are you endeavoring to evade giving a direct answer to the questions I am asking?'

"'No. I take a test meter—a one-light dry meter—and attach it to the other meter and let the gas run through both of them. My meter is right, and the other is generally wrong.'

"'Will temperature affect registration?' Mr. Lane continued.

"'Yes; we all know that,' said Wilsdon.

"'How?' Which the expert did not explain.

"Mr. Brown attempted to come to the rescue of the expert by suggesting that the questions had better be put to him.

"Mr. Gardner told Wilsdon that he had involved the Trustees in this matter, and he begged him to answer such qestions as were necessary to get at the truth. The expert condescendingly agreed to answer all questions.

"'Do you understand the construction of the inside of a gas meter?' asked Mr. W. W. Goodwin, who was present.

"Wilsdon said he supposed he could take one apart and put it together again.

"Mr. Blakeley, of the *Star*, then stated that Wilsdon had told him that the Continental Hotel had been given a rebate of $900, and that Gas Trustee Gardner was silently backing him in his testing business. Mr. Gardner scored Wilsdon most mercilessly, and concluded by telling him that if he ever used his name again he would suffer for it. 'This man,' said Mr. Gardner, 'is taking money from people by claiming to be an expert, and they ought to be warned against him.'

"Mr. Moore called Wilsdon's attention to an ordinance providing a penalty for tampering with meters, and warned him not to continue his fraudulent practice here in Philadelphia.

"H. H. Rappley read a letter from his agent in Chicago, which was disparaging to Wilsdon, and then stated that Wilsdon had informed him that he came to Philadelphia as an expert meter tester, authorized by the government; also that he had borrowed a meter from his agent in Chicago and had forgotten to return it. At Mr. Brown's request the matter of his claim was postponed till called up again by Mr. Gardner.

"Wilsdon declared to a *Times* reporter that he should continue his lucrative business of testing meters here in Philadelphia, and no one could stop him. He is a man of about 40 years of age, of medium size, light, full beard, thin nose, light eyes, and a high bald head. He dresses in dark clothes and wears a high cloth hat."

The Meter Expert at New Philadelphia, Ohio.—This time the "expert" hails from Ohio, and his researches have a beautiful flavor of originality about them. We are sorry that we are not able to place his name on record, so that he should obtain the full recognition of his individual merit. But here are his "findings:" "In New Philadelphia, Ohio, they are having a big time over their gas bills. The citizens complain that the gas meters are frauds, and a recent examination seems to confirm the charge. Many tests have been made, the expert furnishing his own meter to detect the doctoring of the gas company's meters. One of the things proven was the fact that the meters, under heavy pressure, permitted gas to be forced into the pipes at the consumers' residences and places of business, registering the flow accurately as it passed in; then, under a lighter pressure, it leaked back into the main pipes—no record being made of the leakage. In this way some families who had been away from their homes for weeks, and who had not used a particle of gas, found considerable bills charged up against them." The merits of this "expert" should send his name down to posterity.

"Uncle Reub's" Opinion.—A dispatch has been received at the Philadelphia *Press* office, dated Harrisburgh, signed "Uncle Reub," and marked "collect." It read as follows: "don't Accept president's offer to Examine gas meter, tisn't meter it's the hands—took hands off a meter once—they still kept going around like a Mule in a Brickyard—put a Coal Scuttle on the hands—carried the Hod full of coal right around—sat on the Hod, carried me around till I got Dizzy and fell Off—put leg of my best Chair between hands to stop them—cut through leg cleaner than a Buzz Saw—ruined Chair—meter Hands accidentally Invented by a Lunatic at work on perpetual Motion in a Third Story Back with closed Shutters—I put a Ladder to window Bored a Hole through shutters and Discovered his secret—no Use trying to stop meter Hands—trouble is both go Same Way—if went different ways could be fixed so as to cut each Other in Half but pieces would go All Same, go till wear out, Look Out Don't Cut your Head Off."

What Mr. Taber will do.—Mr. Robert B. Taber, of the New Bedford (Mass.) Gas Light Company, is successfully engaged in utilizing ammoniacal liquor. He is purchasing liquor of 20-ounce strength, and will be glad to correspond with gas companies in New England that contemplate producing concentrated liquor. The quantity per ton of coal is so much reduced at this strength that it can be economically transported long distances by rail or vessel. The early completion of the ammonia-soda works at Syracuse will undoubtedly advance the price of sulphate, and, in consequence, ammoniacal liquor, in this country.

Cheaper Gas for Richmond, Va.—The Committee on Light are still wrestling with the problem of cheap gas, and in order to reach results satisfactory have appointed a sub-committee, consisting of Messrs. Higgins, Crenshaw, and Bowie, whose duty it shall be to consider the expediency of amending the gas ordinance so as to establish a schedule of prices ranging from $1.50 per 1,000 cubic feet down to $1.25, to take effect from the 1st of January, 1884, the price to be regulated according to the quantity consumed. This committee will set to work at once, and push their labors as vigorously as possible, and report at their earliest convenience. In connection with the subject of light the following table will be found interesting:

Number of consumers who use			5,000 feet of gas per month	174
"	"	"	10,000 feet of gas per month	46
"	"	"	15,000 feet of gas per month	39
"	"	"	25,000 feet of gas per month	13
"	"	"	50,000 feet of gas per month	7
"	"	"	100,000 feet of gas per month	1

Colonel Douglas, of the Richmond and Danville Railroad Company, has applied for the introduction of a gas main to the new freight depot building of the company. The depot is 146 feet long, and it will take a good deal of gas to light it.

Incandescence Lights at New Orleans, La.—The Edison system of incandescence lamps has lately been installed at the St. Charles Hotel, New Orleans, La. In mentioning the fact that such an installation had been accomplished, a writer speaking through the columns of New Orleans *Picayune* of date of April 3, mentions, among other things, that, "It is a remarkable and significant fact that Edison gets nearly three times as much light from a pound of coal as the gas companies, and herein *lies* the promise of its *future* usefulness." The italics are ours.

Mr. Carroll writes that he visited the hotel, and was much astonished at the difference between a real 16 candle light, and the incandescent light represented as equal to 16 candles. The light looked as red as an ordinary gas light; and, so far as Mr. C. could judge from the evidence of eye-sight, gave a light of 12 candles—*nothing more*. Some of the lights he did not think were equal to 10 candles. The average illuminating power of gas supplied by the New Orleans Gas Light Company during the year 1882 was equal to 16.6 candles. There are 150 lights in use in the St. Charles Hotel, and it is claimed that the total cost, including coal, wages, depreciation, attendance, etc., is but $1.07 per hour. Very nice figuring certainly; but why is the Edison system not in more extended use throughout the country, if this is true?

The Friction Condenser of Messrs. Davis & Farnum.—The following named works have introduced the Davis & Farnum friction condensers since they have been advertising in the Journal:

Portsmouth, N. H.; Quincy, Mass.; Holyoke, Mass.; Brockton, Mass.; Bangor, Me.; and Decatur, Ill. The same firm are now erecting, at the works of the Nassau Gas Light Company, Brooklyn, N. Y., two more of the capacity of 400,000 feet; making a total of 1,200,000 capacity now in use at these works.

Street Lighting at Houston, Texas.—The committee of the city council of Houston, Texas, to whom was referred the application of E. Raphael, President of the Electric Light Company, to establish and maintain 36 electric lights in the streets of the above-mentioned city, reported in favor of allowing the electric light people to place in position 32 lamps instead of 36. The contract price is 82½ cents per light per night. The committee say in their report, "It is true that the financial condition of the city at the present time is not very flattering, owing to some derangement in the collector's department, but it is believed that this matter will be adjusted within a few days when everything will resume its proper shape." Right on the heels of this statement this same committee recommends that a contract be entered into whereby the city is pledged to pay a most exorbitant price for electric lighting. One or two more recommendations of a similar nature, it would strike us, would require that affairs in the bureau of audit might suffer "derangement," and necessitate a "readjustment" of the kind now so popular in the South owing to the efforts of Mahone and his able imitators.

Mr. T. F. White, Secretary and Treasurer of the Houston Gas Light Company, made a proposition on behalf of himself and associates; the proposition was referred to a committee consisting of Aldermen Kennedy, Thomas and Meyer, and is as follows:

To the Honorable Mayor and Aldermen of the City of Houston—Gentlemen: The Houston Gas Light Company hereby agrees to contract with the city of Houston to light with gas the street lamps on the line of its mains, and keep the same regularly lighted during the hours specified in the last contract made between the city and the gas light company, on the following terms and conditions:

80 lamps at $2.90 each per month	$232.00
100 lamps at $2.80 each per month	280.00
125 lamps at $2.70 each per month	337.50
150 lamps at $2.65 each per month	397.50
200 lamps at $2.60 each per month	520.00

The gas light company agreeing to keep said lamps in good order during the existence of the contract. Said contract to remain in force for a period of not less than one year and for not more than five years.

Final action has not been taken in the matter, and we hope that when such action is taken there will not be need of any kind of readjustment whatever.

Electric Light in the Streets of Buffalo, N. Y.—The Brush Electric Light Company wants to get a slice of the street lighting in Buffalo, N. Y. On Thursday, April 12th, a committee of the Common Council considered the proposal of the Brush Electric Light Company to light portions of Seneca, Exchange, Elk, Smith and Selkirk Streets, and the Abbott road by electricity at 75 cents per night for each lamp. The company propose to place the lamps not more than 400 feet apart, if a lamp was out from fifteen minutes to an hour, one half the price for the night to be deducted; if out for an hour, the whole price to be deducted. This extinction business is certainly refreshing.

Mr. James Adams said that if the lamps were placed 300 feet apart the company would only charge 65 cents per lamp per night.

Mr. George Fullerton, the Superintendent of the Mutual Gas Company, then addressed the committee and his figures clearly demonstrated that the lighting of the streets named by gas was much cheaper than by electric light. He figured as follows:

Seneca street, between Smith street and Buffalo river, 7,280 feet. Exchange street, between Smith and Seneca streets, 680 feet. Elk street, between Smith and Seneca streets, 6,730 feet. Abbott road, between Exchange street and Buffalo river, 2,650 feet. Smith street, between Exchange street and Abbott road, 3,080 feet. Selkirk street, between Exchange and Elk streets, 1,870 feet. Total distance, 22,290 feet.

Electric lights, 400 feet apart (the maximum) 56. Each lamp per year of 365 nights, at 75 cents per lamp per night, $273.75. Per year for 56 lamps, $15,330.

Gas lamps, 140 feet apart (the maximum) 160. Gas consumed per lamp per year of 3,814½ hours, at four feet per hour, 15,285 feet, making at $1.75 per 1,000 feet the cost per lamp per year $26.70; adding $2.04 per lamp per year for cleaning and lighting, $28.74 per lamp.

Cost of of 160 lamps per year, $4,598.40.

Cost of lamp-posts and lamps and setting them, $2,480.

Total cost of 160 gas lamps the first year, $7,078.40.

Gas cheaper than electric lights the first year, $8,251.60. Gas cheaper than electric light after the first year, $10,731.60.

His statement, however, failed to make any impression upon the committee, as they immediately resolved to report to the council in favor of contracting with the electric light company for lighting the territory in question at 75 cents per lamp per night.

Who is Judge Smith?—This is what the Minneapolis (Minn.) *Evening Journal* thinks—

"No one is foolish enough to believe for a minute that Judge Smith is playing anything else than a big game of bluff in the matter of erecting new

gas works in Minneapolis. A Philadelphia company which represents all the water gas (Judge Smith's kind) companies in the country, was recently granted a franchise at Omaha, but the city required a deposit of $10,000 in government bonds within 60 days from the passage of the ordinance granting the franchise, simply as a guarantee of good faith, but it is almost needless to state that the sixty days elapsed without the "new gas company" being heard from. It is safe to assume that had a similar deposit been required here, Judge Smith would not have been in Minneapolis to-day playing his bob-tailed flush with a view of winning.

"But suppose the gentleman from Aurora should start his works, what would be the result? A portion of the gas-lighted territory of New York City is lighted with this water gas, and during the past few years it has killed many people. It poisons people to death, and is worse than sewer gas, containing so much carbonic oxide. The GAS LIGHT JOURNAL says that previous to its introduction in New York there was for fifty years no record of death from inhaling coal gas, and then it goes on to publish a report on the subject of the danger of the water gas, made by a committee of the council of Richmond, Va., which gives a list of the people who have been killed by its use in New York and Brooklyn—the list giving the name and residence of each victim, together with the name and date of the New York papers containing the account of death. It would therefore seem that the Judge's gas is dear even at $2.00 per thousand."

But; who is Judge Smith?

WILL THE CITY OF DETROIT GET THE MUTUAL COMPANY'S WORKS?—The action of the board of aldermen in concurring in the resolution of the other branch of the city government of Detroit, Mich., directing the controller to take possession of the plant of the Mutual Gas Company, having been approved by Acting-Mayor Raynor, leaves the question, "What is going to be done now?" the leading and most interesting one. President Fitch is reported as saying he could not see how the controller could, in the face of the State Supreme Court, make a seizure of the company's works and mains. That official would make himself personally liable if he undertook to carry out the instructions of the common council, and he (Fitch) thought Mr. Bridge did well in delaying until he got legal advice. Mr. Fitch said: "If the controller wants to take the company's property, I will let him take it, and we will see what it will cost the city. I don't think he is desirous of involving Detroit in an expense of $2,000,000. It will cost the city more to dig up the pipes in the streets than they are worth. The pipes will only sell for old scrap iron, and I don't believe will bring $10 a ton. The citizens also will not stand the tearing up of paved streets, and everyone of them east of Woodward avenue will have good grounds to bring suits against the city for damages for being deprived of gas. As far as the company is concerned, we will await the action of the controller; and if the resolution is put into effect we will at once bring suit for damages. But then there is no legal warrant for seizing anything, and this is plain under the decision." The city will probably have a "hard row to hoe" before getting possession of the coveted works.

A BETTER IDEA COULD NOT BE CARRIED OUT.—Mr. John Sobolewski, of the St. Louis, (Mo.) Gas Light Company, has prepared an excellent pamphlet full of common-sense hints, such as will be readily understood by the gas consumer. Mr. S. aims at educating the consumer up to the point of appreciating the fact that, in order to obtain the full benefit of the gas consumed, proper burners, globes, shades, etc., must be employed; that the distribution service should be properly laid down and maintained; that the question of pressure should be carefully looked to—in short; every point likly to be of benefit to the consumer is clearly and concisely explained. Mr. S. also devotes considerable attention to the meter and its workings. The matter contained in the pamphlets was first published in the *American Trade Journal*, a paper devoted to the technical interests of the Mississippi Valley, and published at St. Louis. No better system than this could be pursued—educate your consumers.

THEY WILL GET INTO DENVER ANYWAY.—Messrs. Elkins & Matthews are the agents, and the United Gas Improvement Company, of Philadelphia, Pa., are the principals; and between them they have agreed that Denver (Col.) needs another gas works, and that Denver shall have it. Noble men; public spirited people. How much smoother would have been the roadway had the Denver Gas Light Company followed the example of the historical "coon."

SHAKY ELECTRIC LIGHT TOWERS AT FOND DU LAC, WIS.—If the Denver Gas Light Company did not "come down," one of the electric light towers at Fond du Lac did. During the prevalence of a gale of wind on the night of April 14, the tower located at the La Belle Wagon Works was leveled to the ground. Considerable uneasiness is manifested lest the other towers might take a similar notion. No lives were lost.

SHIPPING FACILITIES ACQUIRED BY THE YOUGHIOGHENY RIVER COAL COMPANY.—A reference to the advertisement of the "Ocean Mine" will show that the Youghiogheny River Coal Company have secured an outlet for their "Ocean Mine" coal to South Amboy, N. J.—and Philadelphia, Pa.—over the Pennsylvania Railroad. These facilities are in addition to those already secured by the company at Baltimore, Md.

Correspondence

[The JOURNAL is not responsible for the opinions expressed by correspondents.]

Suggesting Combination for Defence.

NEW YORK, April 21, 1883.

To the Editor AMERICAN GAS LIGHT JOURNAL:

If I am correctly informed a gas opposition crowd have banded together to raid the different gas companies of this country in the shape of opposition works, and the usual sell-out, compromise, or divide process; in fact, practicing a sort of lawful piracy on the knock-down and drag-out order. This company is known as the United Gas Improvement Company of Philadelphia, Pa.; and its representatives are before the councils of a-half a dozen cities, seeking rights, etc. They claim the water gas process, and will dicker anyhow to get at the cash-boxes of gas companies doing legitimate trade.

I write this to suggest to the coal gas companies the prudence of combining for purposes of defence; and to that end suggest that a dozen or more of such companies create a defence fund of, say, 25 cents per thousand on all the gas each sells, and pay this fund into a pool to be used for defensive purposes only. That is to say—if one or more companies be assailed, such companies to at once reduce prices to a point, say 50 cents per thousand below cost, and maintain the price at such a point until the opposition succumbs; then let the assailed companies draw enough money from the pool to make good the loss incurred. Were such pools in vogue you would hear less of these gas raids.

I put forth these suggestions as crude ideas which, if stated through your paper, would certainly develop some feasible plan for mutual protection. I am, to some extent, a holder of gas securities, and would like to continue such holdings, if the business can be made safe from this species of piracy; if not, then would like to be out of it. I am, however, of the belief that there will be enough of brains found in the trade to work up such a plan of procedure as will enable us to drive every "patent-gas opposition man" out of the business—and I await the near dawning of such a day.

Will you please agitate the matter, if you think the idea worthy of such attention. Yours truly, HENRY HANNON.

Mr. Bostwick Explains the Position of the Standard Oil Company.

NEW YORK, April 16, 1883.

To the Editor AMERICAN GAS LIGHT JOURNAL:

DEAR SIR:—At various times there have appeared statements or intimations that the Standard Oil Company is directly interested in the gas business. Like many other allegations concerning this corporation the statements referred to are entirely without foundation.

We desire therefore to correct any wrong impression that may exist on the subject, by stating through your columns the fact that the Standard Oil Company has no ownership in, or connection with, any firm or corporation constructing or maintaining gas works or making or supplying gas, nor has it any exclusive relation or arrangement with any such concern. We shall be pleased at any time to hear from gas makers or companies who may be under different impressions regarding our position towards them.

Respectfully, J. A. BOSTWICK, for Standard Oil Company.

The Market for Gas Securities.

NEW YORK, April 30, 1883.

The market for gas securities since the publication of our last issue, has held its own as to quotations—but little sign of weakness having become apparent. In city stocks the general tendency among bidders appears to point to higher figures. Metropolitan gas steadily appreciates in value; and, all things considered, this stock may be looked upon as a purchase, even at the prevailing figures. It is now carrying a 6 per cent. dividend, which is payable May 8. New York gas is a shade easier. This is accounted for by the fact that the stock is selling "ex-dividend" of 5 per cent., payable May 1. It will be noted that Manhattan gas rules strong and higher—238 being bid, ex-dividend of 5 per cent., payable May 1. Central gas shows decided tendency to higher figures, 85 being bid, as against previous quotation of 80. Mutual gas has advanced a peg; and it would seem that investors are not alive to the chances when the bonds of the Mutual Company are only quoted at 103. Harlem is steady, and maintains the advance of some months ago—we quote latest figures 97 to 100. Municipal gas has shown some weakness, and is quoted at 177 to 180—rather a sharp "drop." Brooklyn securities in the gas line are all higher. Brooklyn gas has sold as high as 117¼, and we think a fair figure at this date would be 118; this company has declared its regular semi-annual dividend of 5 per cent. Williamsburgh gas rules strong at higher prices. Citizens gas also shows a higher figure. Fulton Municipal is steady; and the same may be stated of Metropolitan gas. Nassau gas is buoyant—quite a material advance being noted. The bonds of the Williamsburgh Gas Light Company would appear to us to be the safest investment-security in the list, and ought to, and will, bring higher figures.

Out of town shares are generally stronger, San Francisco gas being up to 59. Central gas (San Francisco, Cal.) is steady at 40, as is also Oakland gas, of same place, we quote it at 29¾. Boston gas has made a large advance, and it will see higher figures. Baltimore gas securities are weaker. The Laclede gas, St. Louis, Mo., shares are weaker, being affected by the opposition proceedings. Strange to say, on the contrary, old St. Louis gas is as "stiff as a board," 282 being bid. Hartford gas is steady to strong, and the same may be said of Jersey City gas. On the whole the market-outlook is very satisfactory. We note auction sales: Twenty shares New York gas, at 123 ex-dividend; 800 shares Brooklyn gas, at 116½–117¼; 300 shares Jersey City gas, at 163; 3 shares Boston gas, (sold March 31—given to show a quotation) at 802½, the "par" of Boston is $500. The New York Daily *Times* appears to have "exclusive information" concerning the financial operations of the Washington (D. C.) Gas Light Company. The Philadelphia people who are so busily engaged in "furnishing estimates" ought to secure the services of this *Times* correspondent—he can do almost anything with figures.

Gas Stocks.

Quotations by Geo. W. Close, Broker and Dealer in Gas Stocks (with W. B. Scott & co.,)

34 Pine Street, New York City.

May 2, 1883.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

	Capital.	Par.	Bid	Asked
Central	$466,000	50	85	90
Harlem	1,800,000	50	97	100
" Bonds	170,000		—	—
Manhattan	4,000,000	50	235	240
Metropolitan	2,500,000	100	190	193
" Bonds	658,000	—	105	110
Mutual	3,500,000	100	116	118
" Bonds	1,500,000	1000	103	105
Municipal	3,000,000	100	177	180
" Bonds	750,000		107	110

PROPOSALS.

Office of Superintendent of City Gas Works, Richmond, Va., April 26th, 1883.

SEALED PROPOSALS WILL BE RECEIVED AT THIS OFFICE UNTIL 5 P.M. MAY 15, 1883, FOR REMODELING ONE SECTION OF THE RETORT HOUSE AT THE CITY GAS WORKS, including the complete construction of TEN BENCHES, of six retorts each, with hydraulic main, stand and dip pipes, etc, to be built according to plans and specifications adopted by the Committee on Light. The plans and specifications, with the form of contract, bond, etc., can be seen at any time by application at this office. Any further information desired can be obtained on communicating personally or by letter with the Superintendent. The Committee on Light reserve the right to reject any and all proposals.

JOHN H. KNOWLES, Superintendent.

FOR SALE.

SECOND-HAND

TEN INCH GAS WORKS,

Consisting of Boiler, Engine, Rotary Exhauster, Twelve-foot Purifiers, Condenser, Scrubber, Seven-foot Station Meter, with all necessary By-Passes, Connections, and Gauges. Works been in use between five and six years. Drawings of same will be furnished to parties desirous of purchasing.

Address **P. O. Box 373,**

573-6t Pittsburgh, Pa.

WANTED.

A SUPERINTENDENT FOR SMALL GAS WORKS

NEAR BOSTON.

Address, giving references and qualifications, with salary expected, **P. O. Box 5104, Boston, Mass.**

A TABLE

GIVING THE MONTHLY RANGE OF PRICES DURING 1882 OF BANK STOCKS, INSURANCE, GAS, CITY RAILROAD, AND TRUST COMPANY STOCKS OF NEW YORK AND BROOKLYN. To be had on application.

J. P. WINTRINGHAM, 36 Pine St., N. Y. City.

WANTED,

Two Sections Hydraulic Main, Bridge and Stand Pipes, and Mouthpieces for Benches of Fives.

572-2t Address "Hydraulic Main," this Office.

FOR SALE.

Columns (20 ft. high, Cast Iron), Girders, Angle Iron, King Posts, and the Internal Framing of two 48-feet Holders.

The above materials are as good as new. Apply to

GAS WORKS, WILMINGTON, DEL.

570-4t Thos. Curley, Supt.

FOR SALE.

Gardner Bros. Gas Retort and Fire Brick Works.

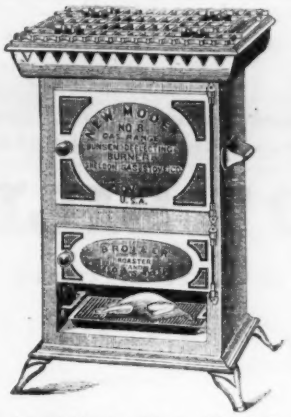
Established in 1864. Situated at Lockport Station, on the P. R. R., 60 miles from Pittsburgh, Pa. The Works consist of complete plant for manufacturing Clay Gas Retorts, Settings, Blocks, Tiles, and Fire Brick. Capacity, about 100 retorts, with necessary settings, and 100,000 fire brick per month. Clay and coal mined by ourselves within short distance of Works and hauled in wagons. Over three acres of land, with all necessary buildings, a number of tenements and town lots. The P. R. R. has side track alongside our kilns. Good trade established. Our good will and influence to go with sale. Statement of business done will be shown to responsible parties desiring to purchase. Any further information desired will be cheerfully given by Gardner Bros., Lockport, Pa.

ALSO,

Gardner Bros. "Standard Savage" Fire Brick Works.

Established in 1873. Situated at Ellerslie Station, Md., on Balt. & O. R. R.; also on Bedford Branch of P. R. R. Has convenient shipping arrangements on both roads. Works consist of two independent plants of machinery, so constructed and arranged that they can be run separately or together. One of the buildings entirely new, erected last year. Capacity of Works, over 14,000 bricks per day. Mount Savage Clay in abundance, mined on royalty, and delivered direct into Works by gravity. Inclined plane and tramroad, large portion of which was laid with new T-rail last year. New artesian well, capacity over 35 barrels per hour; also mountain stream delivering water by gravity into tanks at Works. Seven acres of land, with 9 good tenements. Everything in first-class order for manufacturing and shipping brick direct from kilns into cars. Good and growing trade established. Brick unquestionably as good as the best made of Mount Savage Clay. Statements of business done will be shown to responsible parties desirous of purchasing. Our good will and influence to go with sale. Any further information desired will be cheerfully given by Gardner Bros., Lockport, Pa.

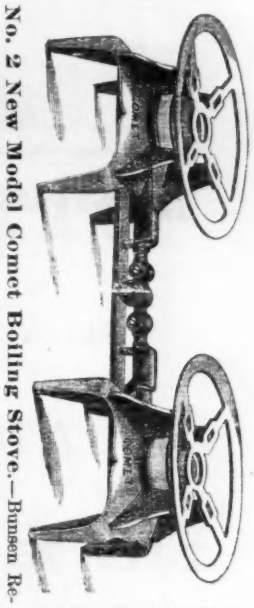
No. 2 Comet Furnace.—Bunsen Retort Burners. Consumes 8 feet of gas per hour each burner, under 1 inch pressure. Price $6.00.



Sheldon's New Model Gas Range.

With Starr's Double Return Flue over the baking oven. The only Gas Stove that will brown pastry without placing under the sub-oven

No. 2 New Model Comet Boiling Stove.—Bunsen Retort burners. Consumes 8 feet of gas per hour each burner, under 1 inch pressure. Price $3.75.



Office Thos. L. Gaussen, Agt. Cincinnati Gas Light Co., Cincinnati, Ohio, March 28, 1883.

Col. H. H. Sheldon: Dear Sir—I have tested your New Model Gas Stove to my entire satisfaction, and find the Starr Double Return Flue, which you have adopted in your new stove, is of the greatest value, as it browns nicely in the oven, both on top and bottom, without putting it under the sub-flame. We baked bread in 25 minutes, and biscuits in 12 minutes, that were baked just as nicely as could be; and I cheerfully recommend it as the most perfect stove I know of, and I have now on hand every kind and make known that are of any account. Yours truly, Thos. L. Gaussen, Agt.

SHELDON GAS STOVE CO., PROVIDENCE, R. I., U. S. A.

"Their Merit has Established their Great Popularity."

GAS RETORT STOVE COMPANY.

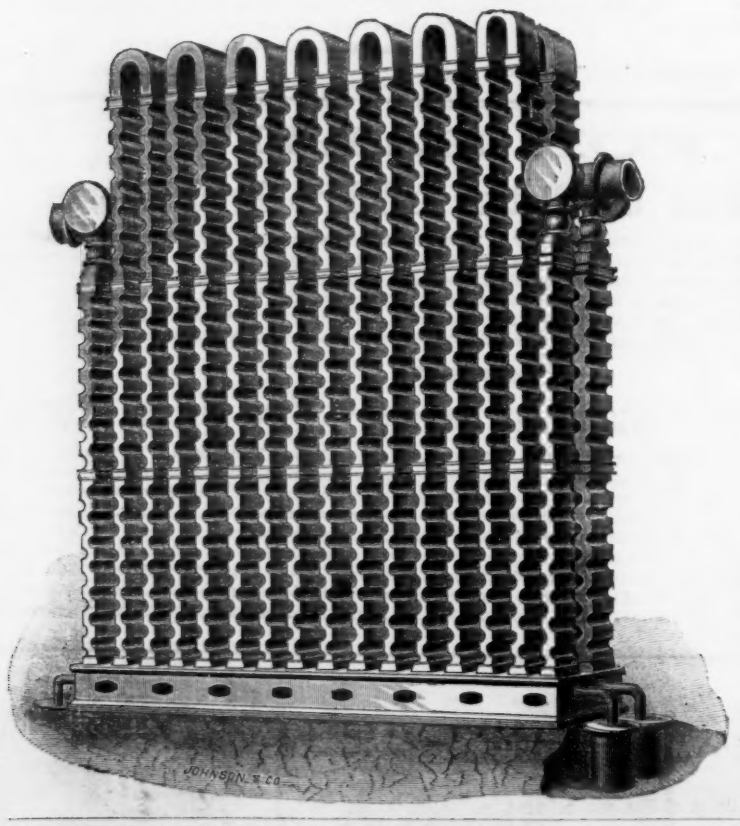
The Retort Gas Stoves still continue to maintain the lead. The use of Gas Cooking Stoves becomes more general each year, and those gas companies and house furnishing dealers who keep a stock of Retort Gas Stoves are sure to find a ready sale for them. The Retort Gas Stoves are sold on their merits, and satisfaction is guaranteed. We make a large variety of sizes and patterns, and the prices are 20 per cent. cheaper than others offer.

JAMES C. LESTER, Agent, P. O. Box 1256, PROVIDENCE, R. I.

F. J. DAVIS & J. R. FARNUM,

TRUSTEES AND AGENTS FOR THE

SINUOUS FRICTION CONDENSER.



We desire to draw the attention of the gas community to the merits fo the SINUOUS FRICTION CONDENSER. Companies intending to introduce new condensers into their works will do well to confer with us and examine plans and estimates before contracting for any other pattern. The FRICTION CONDENSER is now in use at the gas works located in the following places:

Portland, Me.	Brookline, Mass.	Pawtucket, R. I.	Fredericton, N. B.
Newport, R. I.	Chelsea, Mass.	Jamaica Plain, Mass.	St. John, N. B.
Gloucester, Mass.	Woburn, Mass.	Attleboro, Mass.	Paterson, N. J.
Newton & Watertown, Mass.	Peoria, Ill.	Calais, Me.	Dover, N. H.
	Clinton, Mass.	Fall River, Mass.	Waltham, Mass,

Nassau Works, Brooklyn, N. Y.

DAVIS & FARNUM MFG. CO.

MANUFACTURERS OF

Gas and Water Pipes,

AND

GAS AND WATER MACHINERY

OF THE MOST APPROVED PATTERN.

Also, Gasholders and Iron Roofing.

Orders from Gas and Water Companies promptly attended to.

WALTHAM, MASS.

"OTTO" SILENT GAS ENGINE.

OVER EIGHT THOUSAND DELIVERED.

Sizes: 1, 2, 4, 7, 10, 15, and 25 Indicated Horse Power.

ADVANTAGES.

No Boiler Needed,

NO TROUBLE WITH COAL, ASHES, SMOKE, INSURANCE, WATER, OR CONSTANT ATTENDANCE. NO DANGER OR RISK OF FIRE.

CLEANLINESS, ECONOMY, COVENIENCE, SAFETY, AND DURABILITY.

AVERAGE CONSUMPTION PER HORSE POWER

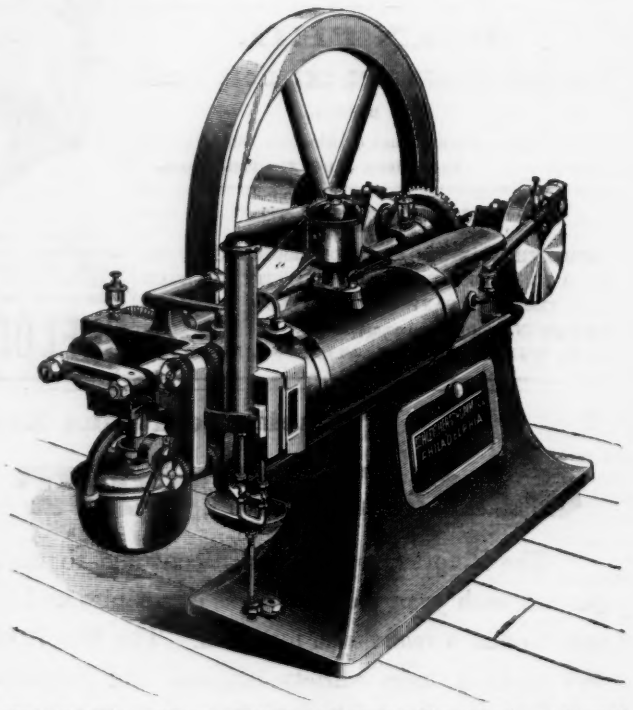
21 1-2 Cubic Feet Per Hour.

Having made Important Additions to our Works, we can now offer to supply Engines from 1 to 15 HP on short notice.

For particulars, prices, etc., apply to

SCHLEICHER, SCHUMM & CO.,

N.E. Corner 33d and Walnut Sts., Philadelphia, Pa.



Cut of 1 Horse Power Engine, Showing New Design adopted for this Size.

Awarded the Semi-Centennial Gold Medal by the Am. Inst., 1881. Awarded the First Premiums at St. Louis, '81 & '82.

AMERICAN METER CO.,

SOLE MANUFACTURERS OF THE

"ECONOMY" GAS STOVES

In presenting our "Economy" Gas Cooking Stoves for the season of 1883, we would state that we are most firmly convinced of their superior efficiency, durability, and economical use of gas for culinary purposes. To promptly meet the demand we anticipate for these Stoves, we have arranged to keep large and varied stocks at our manufactories and agencies.

These Stoves have been awarded the *Semi-Centennial Gold Medal* and *Medal of Superiority* at the Exhibitions of the American Institute, 1881 and 1882, the *First Premiums* at the St. Louis Fairs, 1881 and 1882, and the *Gold Medal* of the Union Universelle de l'Art Culinaire. AMERICAN METER COMPANY.

"ECONOMY" GAS STOVES.

All sizes of our "Economy" Range, from "6A" upward,

ARE FITTED WITH THE

NEW AND IMPROVED ROASTING OVEN DOOR

With these Stoves all qualities of Gas can be used.

NO EXTRA CHARGE FOR NICKEL PLATED FITTINGS.

UNEQUALED ECONOMY OF GAS FOR THE QUANTITY OF COOKING DONE.

A THOROUGHLY DIFFUSED HEAT THROUGHOUT THE WHOLE STOVE.

ALL THE OVENS TIGHT, JACKETED, AND PERFECTLY VENTILATED.

PATENT SMOKELESS GAS-AND-AIR BURNERS OF SUPERIOR POWER FOR BOILING, FRYING, STEWING, PRESERVING, JELLYING, HEATING SAD-IRONS, ETC.

GENERAL AND SPECIAL SUPERIORITY IN ALL COOKING OPERATIONS.

A BROILER UNDER THE FIRE WITHOUT SMOKE.

AN OPEN ROASTER UNDER THE FIRE WITHOUT SMOKE.

UNSURPASSED EXCELLENCE OF WORKMANSHIP AND FINISH.

DOWNWARD RADIATING BURNERS OF GREAT POWER.

RADIATING BURNERS THAT CONSUME THE GAS OF ANY LOCALITY WITHOUT ODOR OR SMOKE.

BURNERS THAT ARE PRACTICALLY INDESTRUCTIBLE FROM TIME OR USAGE.

No. 9.—"Economy" Gas Range, with Improved Roasting Oven Door.

THESE STOVES ARE MADE IN ALL SIZES, TO MEET THE REQUIREMENTS OF ANY FAMILY.

SEND FOR ILLUSTRATED CATALOGUE. **AMERICAN METER CO., New York and Philadelphia.**

J. H. GAUTIER & CO..
CORNER OF
GREENE AND ESSEX STREETS,
JERSEY CITY, N. J.
MANUFACTURERS OF
Clay Gas Retorts,
Gas House Tiles,
Fire Bricks, Etc. Etc.
Ground Clay, Fire Brick and Fire Sand in Barrels.
J. H. GAUTIER. T. B. GAUTIER.
C. E. GREGORY. C. E. GAUTIER.

BROOKLYN
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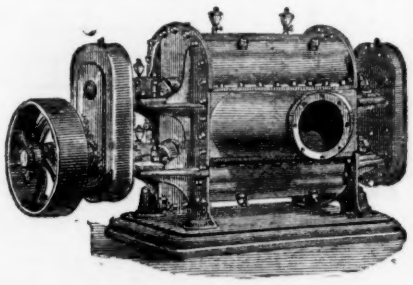

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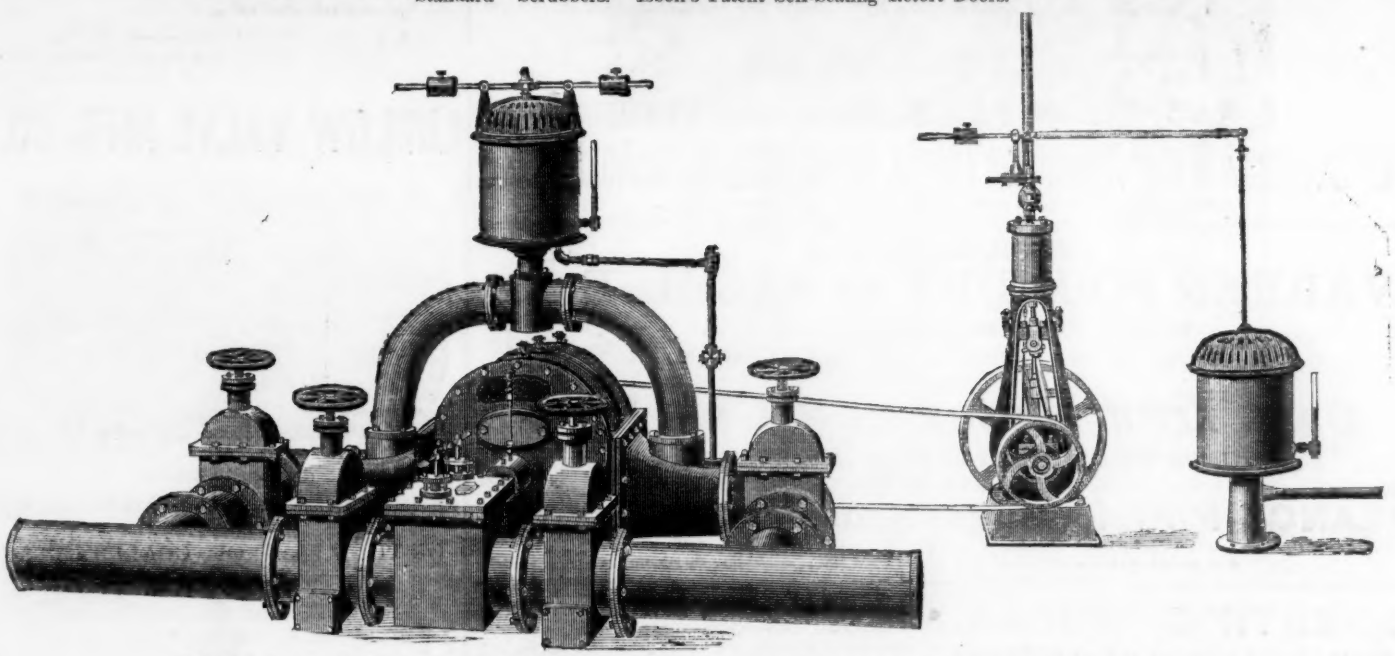

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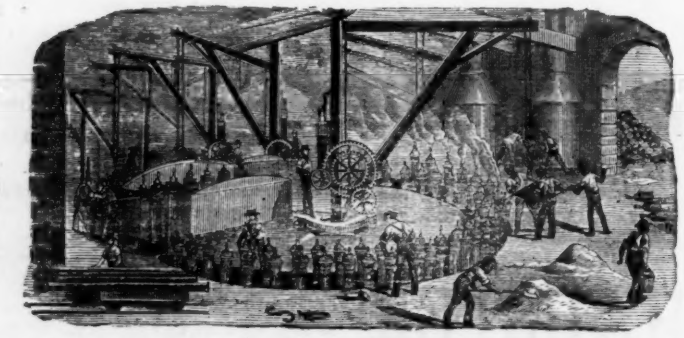

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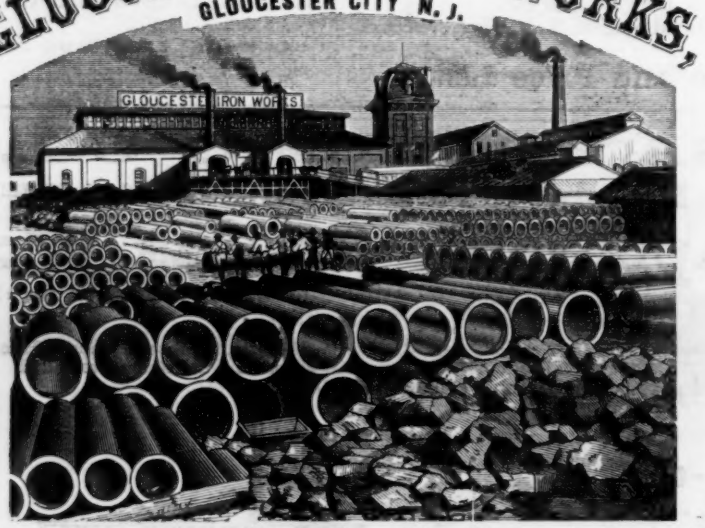

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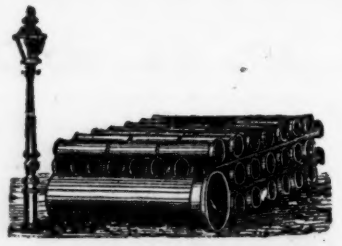

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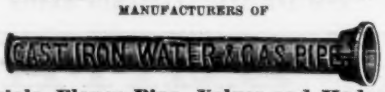

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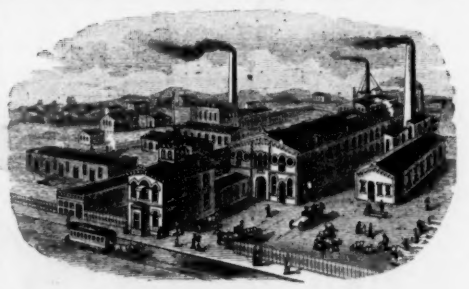

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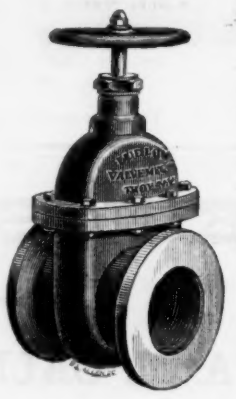

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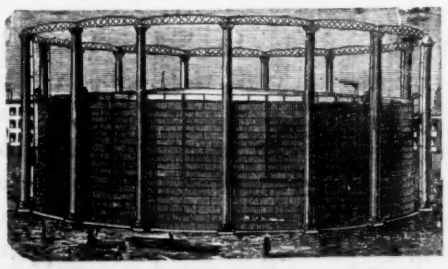

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CORNER BROADWAY AND MAIN STREET, YONKERS, July 2, 1881.

The YONKERS FUEL GAS COMPANY is now in successful operation, manufacturing Water Gas by the STRONG PROCESS, for HEAT, POWER, and LIGHT.

It has about two and a half miles of mains already in use through the heart of the city of Yonkers, and is supplying gas for cooking, heating, and various industrial purposes.

The problem of a purely fuel gas is at length practically solved, and is a complete success. That it must speedily go into universal use is apparent to everyone.

Gas Light Companies are cordially invited to visit Yonkers and inspect this new system, which, if electricity *should* eventually drive them out of the field of illumination, will open to them another field still more vast and fruitful, and from which they never can be dispossessed. The Westchester Gas Light Company of the city of Yonkers employes the Lowe Process for making its gas. Here, then, can be seen, side by side in business competition, the Strong and the Lowe against the Motay and the old coal gas methods, and each observer will be enabled to form his own opinion as to their relative power and value. The STRONG GAS FUEL AND LIGHT COMPANY is the proprietor for the State of New York of the Strong Patents, five in number, and of the Lowe Patents, two in number. All applications for licenses or for information should be addressed, as above, to

R. W. VAN PELT, *President of the Company,*
And also President of the Yonkers Fuel Gas Co., and of the Westchester Gas Light Co.

THE GAS ANALYST'S MANUAL.

BY F. W. HARTLEY, A.I.C.E., M.S.E. E. & F. N. SPON, PUBLISHERS.

PRICE, $2.50.

A. M. Callender & Co., 42 Pine Street, N. Y.

INTERNATIONAL--1876--EXHIBITION.

The U. S. Centennial Commission

HAVE DECREED AN AWARD TO

HARRIS, GRIFFIN & CO.,

12th and Brown Sts., Philadelphia, and 49 Dey St., N. Y., U. S, A.,

FOR THE FOLLOWING REASONS:

The Exhibit consists of a Series of METERS from the Largest Size Station Meters for the use of the MANUFACTURE OF GAS, to those for the use of the ORDINARY CONSUMER. The Instruments are WELL MADE, RELIABLE as to INDICATION, and embody a number of sundry improvements which, with the general character of the Exhibit, entitle the whole to commendation.

Attest—J. L. CAMPBELL, Secretary, pro-tem. Signed—A. T. GOSHORN, Director General J. R. HAWLEY, President

CHARLES E. DICKEY. JAMES B. SMALLWOOD. CHARLES H. DICKEY.

Maryland Meter and Manufacturing Co.,

DICKEY, TANSLEY & CO.,

Established 1866.

Nos. 22 and 24 Saratoga Street, Baltimore, Md.

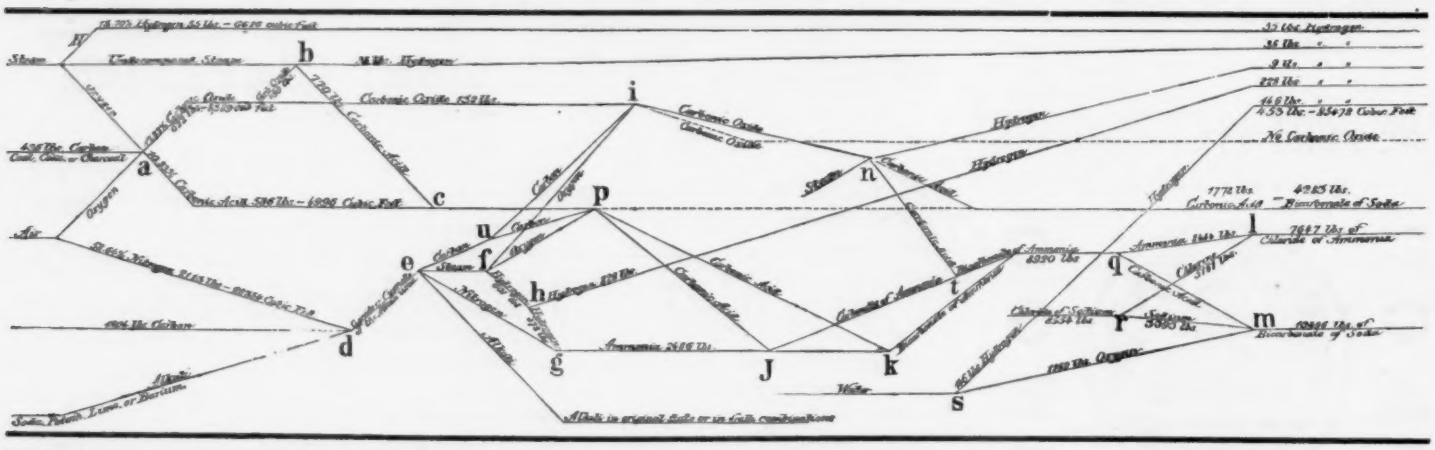
MANUFACTURERS OF

DRY GAS METERS, STATION METERS, GLAZED METERS, TEST METERS, METER PROVERS, PRESSURE AND VACUUM REGISTERS, GOVERNORS, INDICATORS, SERVICE AND METER COCKS.

Meter Connections, Patent Car Fare Registers, Church and Tower Clocks with or without Illuminating Dials, and other light Machinery.

FOGARTY'S

PROCESS OF MANUFACTURING WATER GAS.



This Process produces Hydrogen Gas free from Carbonic Oxide, and simultaneously Ammonia and Bicarbonate of Soda.

It consists in—1st, Making a cheap heating gas through the action of steam and air on incandescent carbon 2d Converting the nitrogen of the gas into ammonia. 3d, Converting all the carbonic oxide in the gas into carbonic acid. 4th, Purifying the gas from carbonic acid, without cost, by means of the ammonia produced. 5th, Decomposing the bicarbonate of ammonia produced by means of common salt, producing chloride of ammonia and bicarbonate of soda. For information, address

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To manufacture Wet and Dry Gas Meters, Station Meters, Experimental Meters, Meter Provers, Centre Seals, Governors, Pressure Registers, Indicators, Photometers, and all kinds of Gas Apparatus; Also furnish all other Articles appertaining to the use of Gas Works.

From our long Practical Experience of the Business (covering a period of 33 years) and from our personal supervision of all Work, we can guarantee all orders to be executed promptly, and in every respect satisfactorily.

WILLIAM HELME. JOHN McILHENNY.

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Successors to W. W. GOODWIN & CO.

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MANUFACTURERS OF GAS STOVES FOR COOKING AND HEATING PURPOSES.

Dry and Wet GAS METERS, Station Meters (Square, Cylindrical or in Staves) Glazed Meters, King's and Sugg's Experimental Meters, Lamp Post Meters, Etc., Etc., Meter Provers (sizes 2, 5 and 10 feet), Pressure Guages of all kinds, Pressure Registers, Pressure and Vacuum Registers, Pressure Indicators (sizes 4 inch, 6 inch and 9 inch), King's Pressure and Vacuum Gauges, Dry and Wet Centre Seals, Dry and Wet Governors, Exhauster Governors, Photometers of all descriptions. Letheby's Sulphur and Ammonia Test Apparatus complete—also Testing and Chemical Apparatus of all kinds, and of the most perfect description, for all purposes relating to Gas.

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We use only the very best materials, and employ the most skilled labor, and by our long experience (29 years) and personal supervision of every detail, we feel justified in assuring the public that our goods will give perfect satisfaction. Every Meter emanating from our establishment will bear the State Inspector's Badge, and will be fully warranted by us. Our Annual and Calendar will be sent to Gas Companies upon application.

Cathel's Gas Consumer's Manual.

Enables every Gas Consumer to ascertain at a glance, without any previous knowledge of the Gas Meter, the quantity and money value of the Gas consumed. Also the best method of obtaining from Gas the largest amount of its light.

It will be to the advantage of Gas Companies to supply their Consumers with one of these Guides, as a means of preventing complaint arising from their want of knowledge in regard to the registration of their meters. For sale by

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Blank Books, with printed headings and forms on this system, will be supplied to Gas Companies, by applying to W. P. Fodell Philadelphia, or

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Since 1878, when we began to manufacture these Stoves, we have received 17 Gold, Silver, and Bronze Medals, and 6 Diplomas for Efficiency, Superiority of Workmanship, etc. etc.

ALL FITTINGS ARE NICKEL-PLATED WITHOUT EXTRA CHARGE.

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FROM TWENTY-FIVE TO FORTY PER CENT. OF GAS SAVED BY THE USE OF OUR PATENT OVEN LINING.

STOVES THAT WILL COOK FOR ONE PERSON OR ONE THOUSAND PERSONS AT ONE TIME.

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OVER THIRTY-FIVE THOUSAND STOVES OF ALL SIZES SOLD SINCE 1878.

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Gas Cooking Stove No. 9A. FITTED WITH OUR PATENT TOP AND OUTLET PIPE FOR CARRYING OFF COMPLETELY ALL THE PRODUCTS OF COMBUSTION FROM, OVEN, ROASTER, AND TOP BURNERS.

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We desire to call attention to our IMPROVEMENT IN THE TOP OF THE SUN DIAL GAS STOVE, by means of which all the odors and products of combustion from the ovens and top burners are entirely removed from the room. This is accomplished by channels and flues connected to the pipe shown at back of stove, to which is connected such additional pipe as may be necessary to connect the same with the flue or chimney, thereby producing the same effect in conveying away the products of combustion as is done in the use of the ordinary range, etc. This arrangement fills a want that has long been felt by those who have objected to the use of gas stoves for the reason of there being no adequate means to remove the products of combustion and odors from the roasting chambers, ovens, and boiling burners, all of which is now accomplished. *We have secured the improvement by Letters Patent in this country and Europe, and any attempt at infringement will be prosecuted.*

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